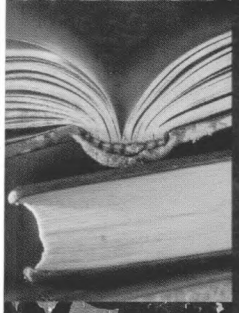

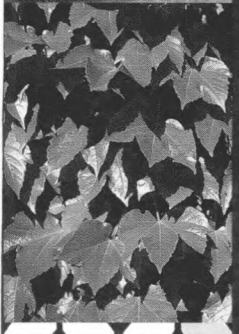

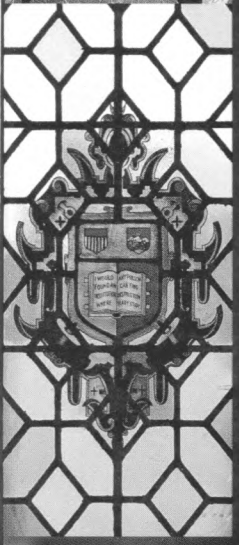

2005–2006

COURSES of Study

Cornell University

Cornell University Calendar

Fall Semester	2005–06	2006–07
Residence halls open	Friday, August 19	Friday, August 18
New undergraduate student registration	Friday, August 19	Friday, August 18
New student orientation begins	Friday, August 19	Friday, August 18
New graduate student registration	Monday, August 22	Monday, August 21
Course add/drop begins	Wednesday, August 24	TBA
Instruction begins	Thursday, August 25	Thursday, August 24
Fall break: instruction suspended	Saturday, October 8	Saturday, October 7
Instruction resumes	Wednesday, October 12	Wednesday, October 11
Homecoming	Saturday, October 15	Saturday, October 14
First-Year Family Weekend	Friday–Sunday, October 28–30	Friday–Sunday, October 20–22
Thanksgiving recess: instruction suspended, 1:10 P.M.	Wednesday, November 23	Wednesday, November 22
Instruction resumes	Monday, November 28	Monday, November 27
Instruction ends	Saturday, December 3	Saturday, December 2
Study period	Sunday–Wednesday, December 4–7	Sunday–Wednesday, December 3–6
Final examinations begin	Thursday, December 8	Thursday, December 7
Final examinations end	Friday, December 16	Friday, December 15
Residence halls close	Saturday, December 17	Saturday, December 16
Winter Session Period Begins	Tuesday, December 27	Monday, December 26
Three-week classes begin	Tuesday, January 3	Monday, January 2
Winter session period ends	Saturday, January 21	Friday, January 20
Spring Semester		
Residence halls open	Monday, January 16	Monday, January 15
Course add/drop begins	Thursday, January 19	TBA
Instruction begins	Monday, January 23	Monday, January 22
Spring break: instruction suspended	Saturday, March 18	Saturday, March 17
Instruction resumes	Monday, March 27	Monday, March 26
Instruction ends	Saturday, May 6	Saturday, May 5
Study period	Sunday–Wednesday, May 7–10	Sunday–Wednesday, May 6–9
Final examinations begin	Thursday, May 11	Thursday, May 10
Final examinations end	Friday, May 19	Friday, May 18
Residence halls close (students who are graduating may stay through Commencement Day)	Saturday, May 20	Saturday, May 19
Senior Week	Sunday–Saturday, May 21–27	Sunday–Saturday, May 20–26
Commencement	Sunday, May 28	Sunday, May 27
Summer Session		
Three-week session classes begin	Wednesday, May 31	Wednesday, May 30
Eight-week session classes begin	Monday, June 12	Monday, June 11
Six-week session classes begin	Monday, June 26	Monday, June 25

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.

This catalog was produced by the Office of Publications and Marketing at Cornell University.

Cornell University

Courses of Study

2005–2006

Change in Course Numbering System

In the near future, the university will be moving from a three-digit to a four-digit course numbering system (e.g., HIST 404 becomes HIST 4041). As part of this transition, this issue of Courses of Study shows both three- and four-digit (in parentheses) course numbers for course listings. For a complete explanation of the course numbering system, see page 12.

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 dpb.cornell.edu/irp/accreditation.htm. 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.

Cornell University

(USPS 132–860)

Volume 97 of the series "Cornell University" consists of four catalogs, of which this is number three, dated August 1, 2005. Issued once in January, once in July, once in August, and once in November. Published by Cornell University, Publications and Marketing, East Hill Plaza, 353 Pine Tree Road, Ithaca, NY 14850–2820. Periodicals postage paid at Ithaca, New York.

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Key

M Monday
T Tuesday
W Wednesday
R Thursday
F Friday
S Saturday
S-U Satisfactory-Unsatisfactory
disc discussion
lab laboratory
lec lecture
rec recitation
sec section
TBA to be announced/to be arranged
@ geographic breadth
# historical breadth
Courses with names and descriptions enclosed in brackets—[ ]—are not offered fall 2005 and spring 2006.
All area codes are 607 unless otherwise specified.

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. Students also should consult with their college's advising office for specific information on their college's academic policies and procedures, degree programs, and requirements. Not included in this publication is information concerning the Medical College and the Graduate School of Medical Sciences, located in New York City.

It is not possible to keep this single volume completely up-to-date. The most current information regarding course descriptions, schedules, sections, rooms, credits, and registration procedures may be found at www.cornell.edu/academics/courses.cfm, which also includes the Course and Time Roster and the Course and Room Roster. Students are also advised to consult individual college and department offices for up-to-date course information.

The *Policy Notebook* (www.policy.cornell.edu/notebook.cfm) summarizes pertinent university policies, including the Code of Conduct and the Code of Academic Integrity. If you do not have web access, the *Courses of Study* and the *Policy Notebook* publications are available in the university libraries, the Office of the Dean of the University Faculty, the Office of the University Counsel, the Office of the Judicial Administrator, and the college offices.

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

Undergraduate Admissions Office, 410 Thurston Avenue, Ithaca, NY 14850-2488, 255-5241, admissions.cornell.edu.

Graduate School, 143 Caldwell Hall, Ithaca, NY 14853-2602, 255-4884, gradschool.cornell.edu.

Law School, Myron Taylor Hall, Ithaca, NY 14853-4901, 255-5141, www.lawschool.cornell.edu/admissions.

Samuel Curtis Johnson Graduate School of Management, Office of Admissions, 111 Sage Hall, Ithaca, NY 14853-4201, 255-4526, www.johnson.cornell.edu/academic/admissions/.

College of Veterinary Medicine, Admissions Office, Cornell University, Schurman Hall, Ithaca, NY 14853–6401, 253–3700, www.vet.cornell.edu/admissions/.

Joan and Sanford I. Weill Medical College and Graduate School of Medical Sciences, Office of Admissions, 445 E. 69th Street, New York, NY 10021, 212-746-1067/-6565, www.med.cornell.edu/education/admissions/.

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 and university health requirements;
- have no holds from the college, the Office of the Judicial Administrator, Gannett: Cornell 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.

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.

Students may withdraw from the university at their own 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 by the student's college upon recommendation by Gannett: Cornell University Health Services.

Bursar Information

TUITION, FEES, AND EXPENSES

Tuition for Academic Year 2005–2006

Endowed Divisions

Undergraduate

Architecture, Art, and Planning Arts and Sciences Engineering Hotel Administration	$31,300

Graduate

Graduate School (with chairman in an endowed college)	$31,300
Johnson Graduate School of Management	$36,350

Professional

Law School	
Entering students	$37,750
second-year students	$37,000
third-year students	$36,280

Contract Divisions (tuition rates are tentative)

Undergraduate

Agriculture and Life Sciences Human Ecology Industrial and Labor Relations	
New York resident*	$17,200
Nonresident (entering students)*	$30,200
Nonresident* (second-year students)	$30,200
Nonresident (third- and fourth-year students)	$29,000

Graduate and Professional Students

Graduate School (with chair in a contract college)	$19,300
Veterinary Medicine	
New York State resident DVM	$22,000
Nonresident DVM	$31,500
Graduate	$19,300

Student Activities Fee

Undergraduate students	$167
Graduate and professional students	$62

Summer Session (2005) $795
per credit**

In Absentia Fees

Undergraduate	$15 per semester
Graduate and professional	$200 per semester
Law and management	$75 per semester

Excess-Hours Tuition
$690 per credit hour

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 following matriculation. The deadline for submission of requests for the Fall 2005 semester is June 1, 2005. The deadline for the Spring 2006 semester is November 1, 2005. Further information and an application can be found at www.bursar.cornell.edu.

  New contract college undergraduate nonresident students are defined as

  - new entering students (i.e., freshmen).
  - new transfers from external colleges (including transfers from two-year institutions with which Cornell has transfer agreements).
  - new transfers from an endowed Cornell college to a contract college.
  - students who have deferred entry of more than one semester.
  - returning students who had withdrawn from the university.
  - graduates who are returning for additional degrees.
  - students who have taken a leave of absence for more than one year.

** **Regular session rate**. Special program rates may vary.

Fees and Expenses

Undergraduate applicants to Cornell pay a nonrefundable $65 application fee when submitting an application for admission. The Graduate and Law School application fee is $65. Application to the Johnson Graduate School of Management costs $180 for MBA applicants and $70 for Ph.D. applicants.

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. All students refer to the "Proration Schedule for Withdrawals and Leaves of Absence" below.

Repayment policy. Students receiving financial aid from the university who withdraw during a semester 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. Cornell is authorized to offset any credit balances against any debts owed by the student to the university.

Proration Schedule for Withdrawals and Leaves of Absence

Fall 2005 and Spring 2006

All Students

Percentage	Fall 2005	Spring 2006
no charge	8/23–8/29	1/19–1/25
10% charge	8/30–9/5	1/26–2/1
20% charge	9/6–9/19	2/2–2/15
30% charge	9/20–9/26	2/16–2/22
40% charge	9/27–10/3	2/23–3/1
50% charge	10/4–10/10	3/2–3/8
60% charge	10/11–10/17	3/9–3/15
80% charge	10/18–10/24	3/16–3/22
100% charge	10/25	3/23

Special programs, such as Cornell Abroad and Executive MBA, may follow their own tuition refund policies for withdrawals and leaves of absence. Please refer to the appropriate program office for details regarding those policies.

BILLING AND PAYMENT

Billing

Tuition and room and board charges will be billed in July and December and must be paid before registration. The due date for these semester bills will normally be 5 to 10 working days before registration day. All other charges, credits, and payments will appear on monthly statements mailed before the middle of the 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.

Changes to billing addresses can be made via Just the Facts. *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.

The Office of the Bursar conducts all business directly with the student. Monthly charges, as well as any awards, grants, scholarships, and loans, are listed and billed under the student's name. Refund checks and direct deposit refunds are also drawn in the name of the student. Cornell is also authorized to offset any credit balances against any debts owed by the student to the university.

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. *Because 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 (tel. 255-2336; fax 255-6442; ucobursar@cornell.edu; www.bursar.cornell.edu). Bursar account and Cornellcard information may be viewed real time on *Just the Facts.*

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 (SHIP) 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 are mailed to each student in July. Undergraduates, graduate students, and professional students each have separate deadlines and guidelines. Please be sure to check the July mailing for complete details.

The Student Health Insurance Plan provides coverage 24 hours a day, 365 days a year, anywhere in the world. Students graduating midyear may be eligible to purchase a five-month plan. Those 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, students should contact Cornell University Office of Student Health Insurance, 409 College Avenue, Suite 211 (tel. 255-6363; sicu@cornell.edu; www.studentinsurance.cornell.edu).

Student Records

The Family Educational Rights and Privacy Act (FERPA) affords students certain rights with respect to their education records. Further details may be found in Cornell University Policy 4.5 Access to Student Information, available at www.policy.cornell.edu/VOL4_5.cfm. These rights include:

1. The right to inspect and review the student's education records within 45 days of the day the university receives a request for access.

   Students should submit to the registrar, dean, head of the academic department, or other appropriate official, written

requests that identify the record(s) they wish to inspect. The university official will make arrangements for access and notify the student of the time and place where the records may be inspected. If the records are not maintained by the university official to whom the request was submitted, that official shall advise the student of the correct official to whom the request should be addressed.

2. The right to request the amendment of the student's education records that the student believes is inaccurate.

   Students may ask the university to amend a record that they believe is inaccurate. They should write the university official responsible for the record, clearly identify the part of the record they want changed, and specify why it is inaccurate.

   If the university decides not to amend the record as requested by the student, the university will notify the student of the decision and advise the student of his or her right to a hearing regarding the request for amendment. Additional information regarding the hearing procedures will be provided to the student when notified of the right to a hearing.

3. The right to consent to disclosures of personally identifiable information contained in the student's education records, except to the extent that FERPA authorizes disclosure without consent.

   One exception, which permits disclosure without consent, is disclosure to school officials with legitimate educational interests. A school official is a person employed by the university in an administrative, supervisory, academic (including emeritus faculty) or research, or support staff position (including law enforcement unit personnel and health staff); a person or company with whom the university has contracted (such as an attorney, auditor, or collection agent); a person serving on the Board of Trustees; or a student serving on an official committee, such as a disciplinary or grievance committee, or assisting another school official in performing his or her tasks.

   A school official has a legitimate educational interest if the official needs to review an education record to fulfill his or her professional responsibility.

   Upon request, the university discloses education records without consent to officials of another school in which a student seeks or intends to enroll.

4. The right to file a complaint with the U.S. Department of Education concerning alleged failures by Cornell University to comply with the requirements of FERPA. The name and address of the office that administers FERPA is:

   Family Policy Compliance Office
   U.S. Department of Education
   400 Maryland Avenue, SW
   Washington, DC 20202-5901

5. Cornell University has defined directory information to include the following: name, local address, local telephone listing, e-mail address, major field of study and college attended, dates of attendance, enrollment status, participation in officially recognized activities (in athletics, the weight and height of members of athletic teams), and any degrees earned and awards. Directory information may be released unless the student informs the Office of the University Registrar otherwise in writing or on Just the Facts. Students who wish to suppress their directory information from the printed telephone directory must inform the Office of the University Registrar in writing or through Just the Facts within 10 days of the date of official university registration. Students may rescind their no-release request at any time by writing to the Office of the University Registrar or on Just the Facts.

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 titled the *Code of Academic Integrity and Acknowledging the Work of Others* is available from the office of the dean of faculty, in the *Policy Notebook*, and at www.policy.cornell.edu/Code_of_Academic_Integrity.html.

Protection of Human Subjects in Research

The University Committee on Human Subjects is the official review board for all university projects that use humans as research subjects, assuring compliance to federal regulations protecting human subjects in research at universities. A human subject is defined by federal regulations as "a living individual about whom an investigator obtains data through intervention or interaction with the individual, or identifiable private information." Projects affected by regulation include, but are not limited to, experiments and psychological or physical tests on humans, surveys, questionnaires, and studies of existing data, documents, or records in which there are individual identifiers. All proposals involving human subjects in any category, including those initiated by students, must be submitted to the University Committee on Human Subjects for review before the research projects begin. The guidelines for the use of human subjects in research are available at www.osp.cornell.edu/Compliance/UCHS/homepageUCHS.htm. Inquiries and communications about the guidelines should be directed to the committee's coordinator (255-5138; UCHS@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. The use of live vertebrates in instruction is reviewed and approved by the Institutional Animal Care and Use Committee (IACUC).

Students should contact the Occupational Medicine Office of Gannett Health Services, or their personal health care provider, before working with animals or entering an animal facility, if they may have any medical conditions that may increase their risk.

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 *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 of 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 chair of the Institutional Animal Care and Use Committee (IACUC) at 253-3845 or by e-mail at iacuc-mailbox@cornell.edu.
9. Faculty members should instruct students in the responsible use of animals. For more information, see www.policy.cornell.edu/vol1_4.cfm.

Advanced Placement

Definition and Purpose of Advanced Placement Credit

Advanced placement credit is college credit that students earn before they matriculate as freshmen and that counts toward the degree and degree requirements as specified by the individual college at Cornell. 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 course of study.

Sources of Advanced Placement Credit

Advanced placement credit may be earned from the following:

1. The requisite score from the Advanced Placement Examinations (AP exams) from the College Entrance Examination Board (CEEB) in Princeton, N.J. The requisite scores, which vary by subject, are determined by the relevant departments at Cornell and are listed on pages 8–10.
2. Acceptable performance on a Cornell department exam (offered only in some subjects, usually during orientation).
3. A regular course taught at an accredited college to college students and approved by the relevant department at Cornell. Some departments accept credit from virtually all accredited colleges; some do not.
4. International credentials from "A" level or IB Examinations are listed on page 11.

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 examination as described in paragraph *1* or *2* above.

The appropriate department of instruction within the university sets the standards of achievement that must be met for advanced placement in its subject, recommends Advanced Placement 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 and applying it to degree requirements rests with each individual college (consult the relevant college sections of *Courses of Study).* Students need not accept advanced placement, although forfeiting the advantage of moving quickly into advanced courses affects one's overall education. If they take the Cornell course they have placed out of, they relinquish the advanced placement credit.

Advanced placement examinations. Entering first-year students should have their scores from CEEB Advanced Placement Examinations sent to their college or school registrar's office (see list below).

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 8–12. Students need to register for those examinations in the relevant department.

Transfer of credit. Entering first-year students 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 below).

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

College of Agriculture and Life Sciences
140 Roberts Hall

College of Architecture, Art, and Planning
B1 West Sibley Hall

College of Arts and Sciences
55 Goldwin Smith Hall

College of Engineering
158 Olin Hall

School of Hotel Administration
174B Statler Hall

College of Human Ecology
145 Martha Van Rensselaer Hall

School of Industrial and Labor Relations
101 Ives Hall

CREDIT AND PLACEMENT

The tables below summarize how credit and placement are determined for most subjects. Supplementary information for some subjects follows immediately.

CEEB's AP Exams

Advanced Subject	*Score*	*Placement (AP) Credit*	*Placement*
Arabic	Department of Near Eastern Studies determines credit and placement based on departmental examination.		
Biology	see www.bio.cornell.edu/advising/ap.cfm for credit and placement information.		
Chemistry	5	4 credits	Department determines placement on basis of student/adviser meeting before registration and/or an exam given during fall orientation. Placement out of 206, 207, or 211; if students take 215 they may also receive 4 AP credits. Pre-med students with AP credit should contact the Health Careers Center to determine how many general chemistry courses they should take. A few medical schools require two semesters of general chemistry; they do not accept AP credit as one of the required courses.
Computer science AB	4,5	4 credits	Placement out of COMS 100. Department also offers placement exam during fall orientation.
Computer science A	5	4 credits	Placement out of COMS 100. Department also offers placement exam during fall orientation.
Economics, micro	4,5	3 credits	Placement out of ECON 101 and HADM 141.
Economics, macro	4,5	3 credits	Placement out of ECON 102.
English literature and composition			varies by college

CEEB's AP Exams *(continued)*

Subject	*Score*	*Advanced Placement Credit*	*Placement*
English language and composition			varies by college
Environmental science	4,5	3 credits	Placement out of EAS 101 or 111 and NTRES 201.
French language	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
French literature	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
German	4,5	3 credits	Department of German Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
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	Department of Classics determines credit and placement based on departmental examination.		
Greek, Modern	Department of Near Eastern Studies 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	Placement out of HIST 153 and 154.
European history	4,5	4 credits	Placement out of HIST 151 and 152.
Human Geography		no credit	
Italian language	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Italian literature	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Latin	Department of Classics determines credit and placement based on departmental examination.		
Mathematics BC	4,5	8 credits	Placement out of MATH 106, 111–112, 121–122, 190, and 191. Permission to take MATH 221, 223, 213, or 231. Students wishing to take engineering calculus will place into MATH 192. *(Engineering and BEE students receive only 4 credits).*
	3	4 credits	Placement out of MATH 106, 111, and 121. Permission to take MATH 112, 122, 190, 191, or 231. *(Engineering and BEE students receive no credit.)*
Mathematics AB or AB subscore of BC exam	3,4,5	4 credits	Placement out of MATH 106, 111, and 121. Permission to take MATH 112, 122, 190, 191, or 231. *(Engineering and BEE students receive no credit.)*
Music	Department of Music 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 112 and then take 208 or 213. Students in the College of Engineering should refer to www.engineering.cornell.edu/student-services/academic-advising/academic-information/ap-credit/index.cfm for credit and placement information.
	4	4 credits	Placement out of PHYS 101.

CEEB's AP Exams *(continued)*

Subject	*Score*	*Advanced Placement Credit*	*Placement*
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 should take the CASE† because they will obtain appropriate placement.
Spanish literature	4,5	3 credits	Department of Romance Studies determines placement. Students should take the CASE† because they will obtain appropriate placement.
Statistics (*excluding engineering students*)	4,5	3 credits	Placement out of AEM 210, ILRST 210, PAM 210, or MATH 171 (not HADM 201).
Studio Art		no credit	
World History		no credit	

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

International Credentials

The policies currently in effect for General Certificate of Education (GCE) "A" Level Examinations and International Baccalaureate Higher Level Examinations are summarized in the table below. 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.

The table lists subjects and the marks for which credit will be awarded.

SUPPLEMENTARY INFORMATION

Chemistry and Chemical Biology

The Department of Chemistry and Chemical Biology offers two 8-credit sequences that satisfy prerequisites for further work in the department: CHEM 207–208 and 215–216. CHEM 215–216 is the sequence intended for students with a solid background in chemistry and strong math skills.

Freshmen may qualify for advanced placement and advanced standing credits in chemistry by satisfactory performance on the CEEB Advanced Placement Examination or an international examination, or by passing an advanced standing examination offered by the department. A score of 5 on the CEEB examination entitles a student to 4 credits. A student may earn 4 or 8 credits by suitable performance on the departmental examination. To take the departmental examination students must sign up beforehand in the Chemistry and Chemical Biology Instructional Office, 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 the director of undergraduate studies, in 760A S. T. Olin Laboratory. Students receiving advanced placement who are interested in a major in chemistry or a related science should consider taking CHEM 215–216 and should consult the CHEM 215 instructor or department staff.

Computer Science

Students who receive a score of 4 or 5 on the AB version of the CEEB Advanced Placement Examination in computer science, a score of 5 on the A exam, or a score of 6 or 7 on the IB exam will receive 4 advanced placement credits and may take COM S 211. These credits may be used to satisfy the requirement in computer programming for students in the College of Engineering.

Freshmen may also earn 4 credits by suitable performance on a departmental examination to be given during Orientation Week. To take the departmental examination, students need only show up at the time and location indicated on the Orientation Week Schedule; advanced signup is not necessary.

English

Separate from AP credit for a high score on the CEEB AP test, 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 first-year writing seminars: ENGL 270, 271, or 272.

Mathematics and Statistics

Students entering Cornell before fall 2004 should contact the Department of Mathematics for placement information. The following applies to students in fall 2004 or later.

The calculus courses MATH 111, 112, and 191 cover substantially the same topics as 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 calculus should, if possible, take one of the CEEB's two Advanced Placement Examinations (Calculus AB or Calculus BC) during their senior year.

Subject	*Marks*	*Credit*
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		see www.bio.cornell.edu/advising/ap.cfm
Chemical and 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 (COMS 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 (excluding Arts and Sciences students)
Mathematics	6 or 7	4 credits and placement out of MATH 106 and 111. Students may obtain more credit by taking the Mathematics Department placement exam. (Engineering and BEE students receive no credit.)
Music		by departmental examination
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)
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 to receive credit.		
Biology	see www.bio.cornell.edu/advising/ap.cfm	
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 and placement out of one first-year writing seminar
	B	3 credits (excluding Arts and Sciences students)
Mathematics	A, B, or C	4 credits and placement out of MATH 106, 111, and 121. (Engineering and BEE students receive no credit.) Students may obtain more credit by taking the Mathematics Department placement exam. Students who take the A level exam in Singapore will receive 8 credits and placement out of MATH 106, 111–112, 121–122, 190, and 191. (Engineering and BEE students receive 4 credits.)
Music		by departmental examination
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. Students in the College of Engineering should refer to www.engineering.cornell.edu/student-services/academic-advising/ap-credit/index.cfm for credit and placement information.

The Department of Mathematics offers a placement examination during orientation week. (Separate mathematics placement exams are offered for students in the College of Engineering or the College of Agriculture and Life Sciences.) The Department of Mathematics exam 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 their placement is incorrect.

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 placement information is useful in any case, and the grade on this test does not become a part of the student's record. No advance registration for the departmental examination is necessary.

Students who have been awarded advanced placement credit for calculus or statistics may not also receive academic credit for similar courses taken at Cornell. Students who have been awarded AP credit for statistics (3 academic credits) will forfeit those credits if they take AEM 210, ILRST 210, MATH 171, or PAM 210.

Students who are in neither the College of Engineering nor in the Biological and Environmental Engineering (BEE) program of the College of Agriculture and Life Sciences. Students who have 4 AP credits for calculus will forfeit those credits if they take MATH 106, 111, or 121. Students who have 8 AP credits for calculus will forfeit 4 credits if they take MATH 112, 122, 190, or 191 and all 8 credits if they take MATH 106, 111, or 121.

Students in the College of Engineering or the Biological and Environmental Engineering (BEE) program of the College of Agriculture and Life Sciences. Engineering students will take the engineering calculus sequence, which assumes students have one semester of calculus experience before entering Cornell. Because the engineering sequence is more advanced than other sequences at Cornell, engineering students may receive at most 4 AP credits, which they will forfeit if they take MATH 190 or 191, the first course in the sequence.

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 College of 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 earned as follows:

1. Students with a score of 4 or 5 on the language Advanced Placement Examination of the CEEB, earn 3 credits, and are eligible to take the Cornell Advanced Standing Examination (CASE).
2. Students who achieve a minimum score of 65 on the Cornell language placement test given during orientation week are eligible to take the Cornell Advanced Standing Examination (CASE). Outstanding performance on this examination can result in a maximum of 3 credits.
3. For formal language work at an accredited college, credit is considered by the relevant department on submission of a syllabus and transcript. Sometimes an exam score or the CASE is also required.
4. Native speakers of languages other than English may, if an examination by the appropriate department is available, be granted a maximum of 3 credits for proficiency equivalent to that required in English for a first-year writing seminar.

Information about times and places of placement tests is available in the orientation booklet and from Academic and Career Counseling Services at sao.cornell.edu/orientation/placement.htm. For more information, see "College of Arts and Sciences" 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, 409 White Hall, for Hebrew; or Munther Younes, 409 White Hall, for Arabic.

Music

Advanced placement and credit are awarded only in music theory, and only on the basis of an examination administered by the Department of Music; that is, credit cannot be earned on the basis of the AP, IB, or other examinations from outside Cornell, nor on the basis of course work done elsewhere. Outstanding performance on the departmental examination will earn students 3 credits and placement directly into MUSIC 152 Tonal Theory II. In rare instances students may place into MUSIC 251, in which case they will earn 6 credits. The placement examination is normally administered on the Sunday during fall orientation week. For more information about the examination, see the departmental web site.

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 (offered only during orientation week, fall semester; appointment required). For information about the departmental examination, students should consult the director of undergraduate studies, 101 Clark Hall (physicsdus@cornell.edu), or the department chair, 109 Clark Hall.

Physics B—Students earning a score of 5 may receive 8 credits for non–calculus-based PHYS 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 4 credits in calculus-based PHYS 112 or 207 instead of 8 credits in PHYS 101 and 102. Those earning a score of 4 may receive 4 credits in PHYS 101.

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

Physics C—Electricity and Magnetism: Students earning a score of 5 may receive 4 credits for PHYS 213.

Students will not receive 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 or 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.

Course Enrollment

PREENROLLMENT

Pre–course enrollment for each semester at Cornell takes place partway through the preceding semester using an online application through Just the Facts. 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. Courses may be added, dropped, or changed online through Just the Facts. Permission-only courses and courses with specific add/drop procedures will be handled using a written add/drop form. The 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, the School of 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	$100*	$100*

†Consult the Summer Session catalog and the Division of Extramural Study brochure for fees.
*Consult the college office for special considerations and requirements.

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.

EXPLANATION OF COURSE NUMBERING SYSTEMS AND COURSE PREFIXES

As the university makes the transition to a new course numbering system, the course levels for three-digit (current) and four-digit (future) course numbers will correspond in the manner shown in the list below. In this issue of *Courses of Study*, all of the current three-digit course numbers and most of the future four-digit course numbers have been included in the course listings (some four-digit course numbers were not available at press time).

100(1100) level—introductory course, no prerequisites, open to all qualified students

200(2000) level—lower-division course, open to freshmen and sophomores, may have prerequisites

300(3000) level—upper-division course, open to juniors and seniors, prerequisites

400(4000) level—upper-division course, open to seniors and graduate students, 200(2000)- and 300(3000)-level course prerequisites or equivalent

500(5000) level—professional level (e.g., management, law, veterinary medicine)

600(6000) level—professional and graduate-level course, open to upper-division students

700(7000) level—graduate-level course

800(8000) level—master's level, thesis, research

900(9000) level—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

No courses are 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 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.

Course Prefixes and Their Meanings

AAS	Asian American Studies
AEM	Applied Economics and Management
A&EP	Applied and Engineering Physics
AIR S	Aerospace Studies
AIS	American Indian Studies
ALS	Agriculture and Life Sciences
AM ST	American Studies
AN SC	Animal Sciences
ANTHR	Anthropology
ARCH	Architecture
ARKEO	Archaeology
ART	Art
ART H	History of Art
ASIAN	Asian Studies
AS&RC	Africana Studies and Research Center
ASTRO	Astronomy
BEE	Biological and Environmental Engineering
BENGL	Bengali
BIOAP	Animal Physiology
BIOBM	Biochemistry, Molecular and Cell Biology
BIOEE	Ecology and Evolutionary Biology
BIO G	Biology
BIOGD	Genetics and Development
BIOMI	Microbiology
BIONB	Neurobiology and Behavior
BIOPL	Plant Biology
BIOSM	Shoals Marine Laboratory
BME	Biomedical Engineering
B&SOC	Biology and Society
BTRY	Biometry and Statistics*
BURM	Burmese
CAPS	China and Asia Pacific Studies
CATAL	Catalan
CEE	Civil and Environmental Engineering
CHEM	Chemistry
CHEME	Chemical and Biomolecular Engineering
CHIN	Chinese
CHLIT	Literature in Chinese
CIS	Computing and Information Science
CLASS	Classics
COGST	Cognitive Studies
COM L	Comparative Literature
COMM	Communication
COM S	Computer Science
CRP	City and Regional Planning
CSS	Crop and Soil Sciences
CZECH	Czech
DANCE	Dance
DEA	Design and Environmental Analysis
D SOC	Developmental Sociology
DUTCH	Dutch
EAS	Earth and Atmospheric Sciences
ECE	Electrical and Computer Engineering
ECON	Economics
EDUC	Education
ENGL	English
ENGLF	English for Academic Purposes
ENGRC	Engineering Common Courses
ENGRD	Engineering Distribution Courses
ENGRG	Engineering General Interest
ENGRI	Engineering Introductory Courses
ENTOM	Entomology
FGSS	Feminist, Gender, and Sexuality Studies
FILM	Film Studies
FD SC	Food Science
FRDR	Freehand Drawing and Scientific Illustration
FRLIT	Literature in French
FRROM	French
GERST	German Studies
H ADM	Hotel Administration
HD	Human Development
HE	Human Ecology
HINDI	Hindi
HIST	History
HORT	Horticulture
HUNGR	Hungarian
IARD	International Agriculture and Rural Development
ILRCB	Collective Bargaining, Labor Law, and Labor History
ILRHR	Human Resources Studies
ILRIC	International and Comparative Labor
ILRID	Interdepartmental
ILRLE	Labor Economics
ILROB	Organizational Behavior
ILRST	Social Statistics
INDO	Indonesian
INFO	Information Science
ITALA	Italian
ITALL	Literature in Italian
JAPAN	Japanese
JAVA	Javanese
JPLIT	Literature in Japanese
JWST	Jewish Studies
KHMER	Khmer (Cambodian)
KOREA	Korean
KRLIT	Korean Literature
LA	Landscape Architecture
LASP	Latin American Studies Program
LAT A	Latin American Studies
LAW	Law
LING	Linguistics
M&AE	Mechanical and Aerospace Engineering
MATH	Mathematics
MIL S	Military Science
MS&E	Materials Science and Engineering
MUSIC	Music
NAV S	Naval Science
NBA	Business Administration
NCC	Graduate School of Management Common Course
NEPAL	Nepali
NES	Near Eastern Studies
NMI	Graduate School of Management, Research and Advanced Studies
NRE	Graduate School of Management, Doctoral Seminars
NS	Nutritional Sciences
NS&E	Nuclear Science and Engineering
NTRES	Natural Resources
OR&IE	Operations Research and Industrial Engineering
PALI	Pali
PAM	Policy Analysis and Management
PHIL	Philosophy
PHYS	Physics
PL BR	Plant Breeding
PL PA	Plant Pathology
POLSH	Polish
PORT	Portuguese
PSYCH	Psychology
QUECH	Quechua
RELST	Religious Studies
ROM S	Romance Studies
RUSSA	Russian

RUSSL	Literature in Russian
SANSK	Sanskrit
SEBCR	Serbo-Croatian
S HUM	Society for the Humanities
SINHA	Sinhala
SNES	Science of Natural and Environmental Systems
SNLIT	Literature in Sanskrit
SOC	Sociology
SPANR	Spanish
SPANL	Literature in Spanish
S&TS	Science and Technology Studies
SWED	Swedish
TAG	Tagalog
T&AM	Theoretical and Applied Mechanics
THAI	Thai
THETR	Theatre Arts
TOX	Toxicology
TXA	Textiles and Apparel
UKRAN	Ukrainian
URDU	Urdu
VETCS	Clinical Sciences
VETMI	Microbiology and Immunology
VETMM	Molecular Medicine
VIET	Vietnamese
VISST	Visual Studies
VTBMS	Biomedical Sciences
VTLIT	Literature in Vietnamese
VTMED	Veterinary Medicine
VTPMD	Population Medicine and Diagnostic Sciences

*Courses in these departments may also be offered in the Department of Statistical Science and listed as STBTRY, STRENGR, STMATH, or STSOC under "General Information" in this catalog.

Class Attendance, Meeting Times, and Examinations

CLASS ATTENDANCE AND MEETING TIMES

Students are expected to be present throughout each semester 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 A.M.	08:50 A.M.
75 MIN	08:40 A.M.	09:55 A.M.
50 MIN	09:05 A.M.	09:55 A.M.
50 MIN	10:10 A.M.	11:00 A.M.
50 MIN	11:15 A.M.	12:05 P.M.
50 MIN	12:20 P.M.	01:10 P.M.
50 MIN	01:25 P.M.	02:15 P.M.
50 MIN	02:30 P.M.	03:20 P.M.
75 MIN	02:55 P.M.	04:10 P.M.
50 MIN	03:35 P.M.	04:25 P.M.
50 MIN	07:30 P.M.	08:20 P.M.
75 MIN	07:30 P.M.	08:45 P.M.
50 MIN	08:35 P.M.	09:25 P.M.

Tuesday/Thursday

50 MIN	08:00 A.M.	08:50 A.M.
75 MIN	08:40 A.M.	09:55 A.M.
50 MIN	09:05 A.M.	09:55 A.M.
50 MIN	10:10 A.M.	11:00 A.M.
75 MIN	10:10 A.M.	11:25 A.M.
50 MIN	11:15 A.M.	12:05 P.M.
75 MIN	11:40 A.M.	12:55 P.M.
50 MIN	12:20 P.M.	01:10 P.M.
50 MIN	01:25 P.M.	02:15 P.M.
75 MIN	01:25 P.M.	02:40 P.M.
50 MIN	02:30 P.M.	03:20 P.M.
75 MIN	02:55 P.M.	04:10 P.M.
50 MIN	03:35 P.M.	04:25 P.M.

NO EVENING CLASSES

Friday

50 MIN	08:00 A.M.	08:50 A.M.
50 MIN	09:05 A.M.	09:55 A.M.
50 MIN	10:10 A.M.	11:00 A.M.
50 MIN	11:15 A.M.	12:05 P.M.
50 MIN	12:20 P.M.	01:10 P.M.
50 MIN	01:25 P.M.	02:15 P.M.
50 MIN	02:30 P.M.	03:20 P.M.
50 MIN	03:35 P.M.	04:25 P.M.

NO EVENING CLASSES

Laboratories and similar exercises

1 HR 55 MIN	08:00 A.M.	09:55 A.M.
10:10 A.M.	12:05 P.M.	
12:20 P.M.	02:15 P.M.	
02:30 P.M.	04:25 P.M.	
(Mon. and Wed.)	07:30 P.M.	09:25 P.M.
2 HR 25 MIN	07:30 A.M.	09:55 A.M.
10:10 A.M.	12:35 P.M.	
02:00 P.M.	04:25 P.M.	
(Mon. and Wed.)	07:30 P.M.	09:55 P.M.
3 HR08:00 A.M.	11:00 A.M.	
10:10 A.M.	01:10 P.M.	
01:25 P.M.	04:25 P.M.	
(Mon. and Wed.)	07:30 P.M.	10:30 P.M.

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 semester.

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 (e.g., athletic, musical, theatrical, or employment).

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 Room Roster*, or online at www.cornell.edu/academics/courses.cfm.

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) during 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 semester 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:

1. 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.
2. 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, such as illness or death in the family.
3. 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 semester, 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 yearlong 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 semester average is computed:

Course	*Grade*	*Points*		*Quality Credits*		*Product*
CHEM 103	B+	3.3	x	3	=	9.9
ENGL 151	C–	1.7	x	3	=	5.1
DEA 145	B	3.0	x	4	=	12.0
PAM 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 semester 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 semesters) 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 semester.
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 semester.
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. (1) Must have 100 credit hours with A, B, C, D grades. (2) The S-U option is available only in those courses so designated in the course catalog after approval by the Educational Policy Committee. (3) Freshmen may not exercise the S-U option. (4) Only one optional S-U course is allowed per semester.

Architecture, Art, and Planning. (1) All courses specifically required for a degree excluded. Various departments may designate specific required courses where S-U will be permitted. (2) 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. (3) 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. (1) Courses that count toward satisfaction of major requirements should not be taken for an S or U grade unless the department grants permission. (2) Permission of instructor. (3) 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. (1) The course in question must be offered with an S-U option. (2) The student must have completed at least one full semester of study at Cornell. Freshmen may not take any courses on an S-U basis during their first semester with the exception of courses graded "S-U only" such as physical education, ROTC, supplemental courses, and writing workshops. (3) The proposed S-U course must count as either a liberal studies distribution or an approved elective in the Engineering curriculum. (4) Students may elect to enroll S-U in only 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.) (5) After the end of the third week of classes, the grading option may not be changed nor will students be permitted to add a course in which they were previously enrolled (in the current semester) under a different grading option. Note: Courses graded S-U do not count toward eligibility on the Dean's List and may weaken a student's chances for acceptance into graduate school. Questions regarding the S-U grading option should be addressed to Engineering Advising.

Graduate School. (1) 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. (1) Maximum of 4 free-elective credit hours per semester. (2) Exceptions are by petition only.

Human Ecology. (1) Not part of student's major. (2) May be used in the 9 credit hours required outside the major in Human Ecology courses. (3) Not part of hours required in humanities, natural sciences, and social sciences. (4) A department may approve S-U grading in specific courses if approved by Educational Policies Committee. (5) Freshmen enrolled in ENGL 137 and 138, which are offered only for S-U credit, are permitted to apply these courses to the first-year writing seminar requirements. (6) Total of 12 credits in S-U courses (not counting physical education) may be counted toward degree requirements during a student's college career.

Industrial and Labor Relations. (1) This option may be elected, if available in ILR electives, or in out-of-college electives but not including directed studies. (2) Degree requirements include a minimum of 105 letter grade (A+ to D-) credits. (3) Student must also be in good academic standing. (4) A U grade is considered the equivalent of an F in determining a student's academic status. (5) Limited to two courses per semester, not to exceed four hours in any one course.

Internal Transfer. (1) S-U grades permitted only when it is the only option or (2) when specifically approved by an admissions officer in the school or college to which the student plans to transfer.

Veterinary Medicine. (1) There is one foundation course in the veterinary curriculum that is offered on an S-U basis only. All other required core courses must be taken for a letter grade. (2) 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 before 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, or requested at transcript.cornell.edu.

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.

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.

PHYSICAL EDUCATION

Classes

All undergraduate students must complete two semesters 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 semesters 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 semester, 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 per week). Gannett: Cornell University Health Services 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 semesters 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.

Internal Transfer Division

Students may not always be satisfied with the original Cornell school or college into which they've been admitted, and 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. Sponsorship 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).

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, Andrew D. White Professors-at-Large engage in a variety of activities including public lectures, ongoing courses, and collaborative research, as well as holding office hours for undergraduate and graduate students. They serve for a six-year term and are full members of the faculty when in residence.

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

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

Term Ending in 2008
Hölldobler, Bert, zoologist
Subrahmanyam, Sanjay, economic historian

Term Ending in 2009
Behrends, Okko, legal historian
Butler, Judith, cultural theorist
Venter, Craig, geneticist

Term Ending in 2010
Aldous, David, statistician
Leeson, Lynn Hershman, digital artist
Peskin, Charles, mathematician
Sala, Osvaldo, ecologist
Tibi, Bassam, Islamist

Term Ending in 2011
Sims, Lowery Stokes, art curator
Wasserstein, Wendy, playwright

FRANK H. T. RHODES CLASS OF '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, ongoing courses, and collaborative research.

Term Ending in 2006
McKinney, Cynthia, educator and politician
Nye, Bill, science guy
Pilger, John, journalist and documentary filmmaker

CENTER FOR APPLIED MATHEMATICS

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

The Center for Applied Mathematics administers a broad-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 Honors Introduction to Analysis
MATH 414 Honors Introduction to Analysis
MATH 433 Honors Linear Algebra
MATH 434 Honors Introduction to Algebra
MATH 611–612 Real and Complex Analysis
MATH 615 Mathematical Methods in Physics
MATH 621 Measure Theory and Lebesgue Integration
MATH 622 Applied Functional Analysis
MATH 631–632 Algebra
MATH 633 Non-Commutative Algebra
MATH 634 Commutative Algebra
MATH 651 Introductory Algebraic Topology
MATH 661 Geometric Topology
T&AM 610, 611, 613, 614 Methods of Applied Mathematics

Analysis (and 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
COM S 671 Introduction to Automated Reasoning
COM S 677 Reasoning about Uncertainty
COM S 682 Theory of Computing
COM S 715 Seminar in Programming Refinement Logics
MATH 486 Applied Logic (also COMS 486)
MATH 681 Logic
MATH 781–782 Seminar in Logic
MATH 783 Model Theory
MATH 784 Recursion Theory
MATH 787 Set Theory
MATH 788 Topics in Applied Logic

Numerical Mathematics and Operations Research
COM S 522 Computational Tools and Methods for Finance
COM S 621 Matrix Computations
COM S 622 Numerical Optimization and Nonlinear Algebraic Equations
COM S 624 Numerical Solution of Differential Equations
COM S 664 Machine Vision
COM S 681 Analysis of Algorithms
COM S 721 Topics in Numerical Analysis
ECE 423 Computer Methods in Digital Signal Processing
MATH 425 Numerical Analysis and Differential Equations
MATH 728 Seminar in Partial Differential Equations
OR&IE 625 Scheduling Theory
OR&IE 630–631 Mathematical Programming, I and II
OR&IE 632 Nonlinear Programming
OR&IE 635 Interior-Point Methods for Mathematical Programming

Discrete Mathematics and Geometry
MATH 441 Introduction to Combinatorics
MATH 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
CHEME 472 Feedback Control Systems (also ECE 472, M&AE 478)
ECE 411 Random Signals in Communications and Signal Processing
ECE 425 Digital Signal Processing
ECE 467 Digital Communication Receiver Design
ECE 468 Telecommunication Systems
ECE 521 Theory of Linear Systems (also M&AE 521)
ECE 525 Adaptive Filtering in Communication Systems
ECE 526 Signal Representation and Modeling
ECE 561 Error-Control Codes
ECE 562 Fundamental Information Theory
ECE 563 Communication Networks
ECE 564 Detection and Estimation
ECE 567 Digital Communications
M&AE 677 Robust and Optimal Control

Mathematical Biology
BIOEE 460 Theoretical Ecology
BTRY 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

CHEME 731 Advanced Fluid Mechanics and Heat Transfer
CHEME 732 Diffusion and Mass Transfer
CHEME 751 Mathematical Methods of Chemical Engineering Analysis
CHEME 753 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 733 Stability of Fluid Flow
M&AE 734 Analysis of Turbulent Flows
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 M&AE 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

ECE 562 Fundamental Information Theory
ECE 563 Communication Networks
ECE 566 Wireless Networks
MATH 671–672 Probability Theory
MATH 674 Introduction to Mathematical Statistics
MATH 777–778 Stochastic Processes
OR&IE 561 Queuing Systems: Theory and 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
BTRY 408 Theory and Probability
BTRY 409 Theory of Statistics

Robotics and Vision

COM S 664 Machine Vision
ECE 547 Computer Vision
ECE 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 Bonding in Molecules
PHYS 553–554 General Relativity (ASTRO 509–510)
PHYS 561 Classical Electrodynamics
PHYS 562 Statistical Physics
PHYS 572 Quantum Mechanics I
PHYS 574 Applications of Quantum Mechanics II
PHYS 651–652 Relativistic Quantum Field Theory

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 five 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 members 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 members and students. The center also hosts a Current Events Roundtable each June that enables Cornell alumni to join faculty members in discussion of key world events.

The center promotes graduate students' overseas field research through an annual competition for travel grants and assistance with the Fulbright fellowship program and the Fulbright-Hayes awards, both administered by the center.

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 that houses 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
255-6370 (tel.)
254-5000 (fax)
www.einaudi.cornell.edu

The Einaudi Center Administration:
Nicolas van de Walle, director
Leilani Peck, associate director
170 Uris Hall

Comparative Muslim Societies Committee:
David Powers, director
386 Rockefeller Hall

East Asia Program (formerly China–Japan Program):
John Whitman, director
140 Uris Hall

Latin American Studies Program:
John Henderson, director
190 Uris Hall

South Asia Program:
Alaka Basu, director
170 Uris Hall

Southeast Asia Program:
Thak Chaloemtiarana, director
180 Uris Hall

Institute for African Development:
Muna Ndulo, director
170 Uris Hall

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

International Programs in the College of Agriculture and Life Sciences:
James Haldeman, senior associate director
31 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:
Josephine Allen and Rosemary Batt, co-directors
190 Uris Hall

International Studies in Planning:
Lourdes Beneria, director
209 West Sibley Hall

Population and Development Program:
Thomas Hirschl, director
333 Warren Hall

Comparative Societal Analysis:
Valerie Bunce, acting director
204 White Hall

Cornell Participatory Action Research Network:
Paula Horrigan, director
450 Caldwell Hall

Peace Studies Program:
Matthew Evangelista, director
130 Uris Hall

Program in International Nutrition:
Edward Frongillo, director
B17 Savage Hall

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

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

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

International Relations Concentration:
David Lee, director
248 Warren Hall

CENTER FOR THE STUDY OF INEQUALITY

363 Uris Hall
254–8674 (tel.)
inequality@cornell.edu
www.inequality.com

The Center for the Study of Inequality (CSI) fosters basic and applied research on social and economic inequalities as well as the processes by which such inequalities change and persist. The study of inequality lies at the heart of current debates about welfare reform, affirmative action, the "glass ceiling," globalization, and any number of other contemporary policy issues. In recent years, public and scholarly interest in issues of inequality has intensified, not merely because of historic increases in income inequality in the United States and other advanced industrial countries, but also because inequalities of race, ethnicity, and gender are evolving in equally dramatic and complicated ways. The mission of CSI is to support research and teaching relevant to issues of inequality, to disseminate findings coming out of this research, and to otherwise facilitate the study of inequality in the United States and throughout the world.

Symposia and Lecture Series

The CSI regularly sponsors symposia, workshops, and lecture series that draw attention to the most pressing problems and controversies in the field. The current schedule of symposia and lecture series is listed on the center's web site (www.inequality.com).

Research Support

For faculty affiliates of CSI, small seed grants for inequality-related research are available, especially for research that has the potential to attract external funding. The CSI also runs a small grant program that supports graduate and undergraduate research on poverty or inequality. The application deadline for all grants is May 1, 2007 (for further details, see www.inequality.com/support/index.shtml).

Internships

The CSI serves as a clearinghouse for student internships that are relevant to the study of inequality. For a full listing of possible internships, please consult www.inequality.com/academics/index.shtml.

Dissemination

The working paper series on the center web site assists in disseminating research findings, opinion pieces, and related scholarship from some of the top scholars of inequality in the world. This series can be found at www.inequality.com/publications/index.shtml.

Awards

The CSI presents a Distinguished Book Award and Distinguished Paper Award for publications that significantly advance our understanding of inequality. The recipients are invited each year to Cornell University to present their research (see www.inequality.com/publications/awards.shtml).

Undergraduate Concentration

The inequality concentration allows undergraduate students to supplement their studies for their major with a coherent program of courses oriented toward the study of inequality. The concentration is organized into tracks examining such topics as globalization and inequality; social policy; the ethics of inequality; poverty and economic development; social movements; education and inequality; race and ethnicity in comparative perspective; the family and inequality; and literature, postmodernism, and inequality. The concentration is open to students enrolled in any of the seven Cornell undergraduate colleges. If the requirements of the concentration are met, a special notation to this effect will be recorded on the transcript (see www.inequality.com/academics/undergraduate.shtml for further information).

For more information about CSI, contact us at 254-8674 or inequality@cornell.edu.

COGNITIVE STUDIES

278C Uris Hall
255-6431
cogst@cornell.edu
www.cogstud.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 members in the following departments: Communication, Computer Science, Design and Environmental Analysis, Economics, Education, Electrical and Computer Engineering, Human Development, Linguistics, Mathematics, Mechanical and Aerospace Engineering, 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 Program" under "College of Arts and Sciences." 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 Michael J. Spivey, director of graduate studies (255-9365, spivey@cornell.edu), or Linda LeVan, executive staff assistant, 278C 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 in the Cognitive Studies Program section under Arts and Sciences.

CORNELL ABROAD

300 Caldwell Hall
255–6224 (tel.)
255-8700 (fax)
cuabroad@cornell.edu
www.cuabroad.cornell.edu

Study abroad is an integral part of a Cornell education. Recent events have made us aware that those aspiring to lead in this century need, more than ever before, knowledge and experience of the diverse world beyond the boundaries of their home country. To help students develop the knowledge, skills, and attitudes necessary for informed citizenship in a transnational world, 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 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 members assist in the planning and application process.

LOCATIONS ABROAD

Cornell students majoring in a broad array of fields in all seven undergraduate colleges study in more than 40 countries each year. 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, Ghana, Kenya, Madagascar, Tanzania, Uganda: School for International Training (SIT)

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

Kenya: Wildlife Management (School for Field Studies)

South Africa: Universities of Cape Town and KwaZulu–Natal, Organization for Tropical Studies, School for International Training (SIT)

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, Beijing; Peking, Nanjing, and East China Normal Universities (CIEE); International Chinese Language Program at National Taiwan University; IES Beijing; CET in Beijing, Harbin, or Hangzhou

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

Japan: *Kyoto Center for Japanese Studies; International Christian University and other university programs; IES Tokyo; CIEE Tokyo at Sophia University

Korea: Yonsei University; Ewha 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

Australia: 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 (Arcadia, Boston University)

New Zealand: Otago and Lincoln Universities; EcoQuest

EUROPE

Czech Republic: CERGE at Charles University, CET program in Jewish Studies

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

France: *EDUCO (Cornell, Duke, and Emory in Paris) at Université de Paris VII, Paris IV, 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; Heidelberg University

Greece: College Year in Athens, Arcadia

Hungary: Central European University

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

Italy: *Bologna Consortial Studies Program; *Cornell College of Art, Architecture, and Planning Program in Rome; Arcadia University in Florence at the Accademia Italiana; Boston University Program in Padova; IES Milan and Rome; 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); Smolny College, Math in Moscow

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

Sweden: *Swedish Practicum in Childhood, Family, and Social Policy 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; City University; University of East Anglia; University of Edinburgh; University of Glasgow; University of Manchester; University of Oxford; 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 and art schools of choice.

Externally sponsored programs in the UK include the British American Drama Academy; the Arcadia, 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 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

Belize, Brazil, Chile, Ecuador, Mexico, Nicaragua, Panama, Peru: School for International Training (SIT)

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

Cuba: University of Havana through COPA; School for International Training (currently suspended)

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; COPA program at Universidad Autónoma de Yucatán, Mexico

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)

Lebanon: American University of Beirut

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, Dominican Republic, Finland, Mongolia, 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 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 during their sophomore, junior, or senior year. Junior year is the traditional choice, but second-semester sophomore year or first-semester senior year abroad is increasingly popular. To ensure preparation, it is important to begin planning for study abroad as early as 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, 300 Caldwell Hall, where students are encouraged to consult the library of study abroad materials, talk with staff members, and attend information meetings. The Cornell Abroad web site is an excellent resource for program offerings and links to universities and programs worldwide, as well as for applications to download and comprehensive information on all aspects of study abroad. 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. *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 2006 semester and the 2006–2007 academic year is February 15, 2006, for all programs *except* Oxford and Cambridge, for which the deadline to study at those universities for the full year in 2006–2007 is November 1, 2005. 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 course work 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 the equivalent of at least two years 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, Hungary, Israel, 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, before 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 in Cornell-managed programs pay a fixed Cornell Abroad tuition per semester, which covers tuition, housing during term (except in U.K. universities), orientation, program-sponsored trips and events, and administrative and financial aid costs, including emergency medical evacuation and repatriation coverage. It may include other items (e.g., meals, commuter passes) depending on the program. Students pay other costs (e.g., airfare and personal expenses) directly. Different fee levels for Cornell programs reflect the relative costs of operation.

Pending approval by the Board of Trustees, in 2005–2006 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 Practicum at the University of Goteborg is $18,550.

There are three tiers of Cornell Abroad tuition for universities in the United Kingdom: Group 1, University of Cambridge, Oxford, and the King's College pre-med program, at $18,100 per semester; Group 2, University of Edinburgh, St. Andrews, Imperial College, King's College, London School of Economics, School of Oriental and African Studies, and University College London, at $15,750; and Group 3, University of Birmingham, Bristol, East Anglia, Glasgow, Manchester, Sussex, Warwick, and York, at $11,700 per semester.

For Denmark's International Studies Program (DIS), the Cornell Abroad tuition is $17,640 per semester, and for the Kyoto Center for Japanese Studies (KCJS), the tuition is $25,000 per semester. For the Bologna Cooperative Studies Program (BCSP) the tuition is $28,800 for academic-year students and $16,800 for spring-only participants.

Students studying in all other programs in 2005–2006 pay the tuition and other costs charged by their programs and a Cornell International Program Tuition of $4,250 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 and there are also external aid sources.

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 of Cornell Abroad 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 normally 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 (300 Caldwell Hall): Richard Gaulton, Ph.D., director; Kristen Grace, 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 as well as a database of cost estimates. In the early weeks of every semester, students and faculty and staff members discuss programs in a series of information meetings announced in the *Cornell Daily Sun* and on the Cornell Abroad web site (www.cuabroad.cornell.edu). The director and associate director are available at Cornell Abroad for individual advising.

College Study Abroad Advisers

Agriculture and Life Sciences: Bonnie Shelley or Tamara Durham, 140 Roberts Hall; *Architecture, Art, and Planning:* Jayne LeGro, B-1 West Sibley Hall; *Arts and Sciences:* Dean Pat Wasyliw, 55 Goldwin Smith Hall; *Engineering:* Dan Maloney Hahn, 167 Olin Hall; *Hotel Administration:* Amber Cohen, 180 Statler Hall; *Human Ecology:* Paul Fisher, 172 Martha Van Rensselaer Hall; *Industrial and Labor Relations:* Kevin Harris, 101 Ives Hall.

CORNELL IN WASHINGTON PROGRAM

M101 McGraw Hall
255-4090
ciw.cornell.edu

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. Washington's vast high-technology sector, concentrated in both telecommunications and biotechnology, creates endless opportunities for the study of recent developments and future prospects in those arenas, as well. Cornell in Washington students enroll in one of two core courses—Studies in Public Policy or Studies in the American Experience—take one or two elective courses, conduct individual research projects, and choose externships from more than a thousand positions in government agencies, research institutes, non-profit organizations, and private professional firms and businesses.

The program is housed at the Cornell Center, 2148 O Street, NW, Washington, DC 20037. The academic and administrative space is located on the first floor and 27 residential units for approximately 60 students 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 permissible.

Applications

Application forms are available from the Cornell in Washington program office at M101 McGraw Hall. Students may also apply at ciw.cornell.edu. Applications should be submitted the semester before participation.

Information

The Cornell in Washington program web site 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 program office at M101 McGraw 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

294 Caldwell Hall
255-8018 (tel.)
255-5240 (fax)
cipa@cornell.edu
www,cipa.cornell.edu

The Cornell Institute for Public Affairs (CIPA) offers a university-wide two-year program of graduate professional studies leading to the master of public administration (M.P.A.) degree. CIPA prepares leaders for government, for nonprofit organizations, and for institutions in the private sector that interact with both.

CIPA Fellows (graduate students) have the opportunity to study public policy and program management from a cross-disciplinary perspective. Students gain an understanding of the political and administrative processes through which issues, problems, and policies are formulated; the economic and fiscal basis for government action in a market economy; and the analytical tools for assessing policy implications. They study the behavior of both public and private organizations and their management. They also develop sensitivity to the moral and ethical dimensions of policy issues.

Faculty Members

The depth and flexibility of the program is reflected in the growing number of affiliated faculty members. CIPA is not confined within a single school or college, but spans the entire university. More than 100 field faculty members, representing 25 departments, welcome CIPA Fellows into their courses and serve on professional report/thesis committees. About 30 members of this group, known as the Program Faculty, teach courses taken most frequently by CIPA Fellows. Within this group, members of the Core Faculty provide instruction in the foundation courses. Core Faculty members include David B. Lewis, CIPA director, City and Regional Planning; Nancy Chau, Applied Economics and Management; Neema Kudva, City and Regional Planning; Theodore J. Lowi, the John L. Senior Professor of American Institutions in the Department of Government; Kathryn S. March, Anthropology; Christine Ranney, Applied Economics and Management; and Jerome Ziegler, Department of Policy Analysis and Management.

M.P.A. Program Flexibility

The two-year master of public administration (M.P.A.) degree program consists of 16 courses; CIPA Fellows typically take four courses per semester for four semesters. Although the M.P.A. program offers a basic structure for study, each CIPA Fellow works closely with a faculty adviser to design an individualized program based on his or her specific area of interest. Courses may be taken through the program in any department or college in the university.

Advising

Upon entering the M.P.A. program, each fellow is assigned a program adviser based on his or her area of interest. These advisers are drawn from the CIPA Core Faculty. They assist fellows in designing their individual program of study and selecting their courses. The assignment of advisors is meant to assist new students in getting a strong start with their studies. Once familiar with the resources available, students are welcome to ask another Core Faculty member to be their program adviser.

Toward the end of their first year, when they select their professional report/thesis topic, CIPA Fellows choose a report/thesis adviser from among the more than 100 faculty members in the field of public affairs. The adviser guides the fellow in research and writing.

Foundation Course Work

To develop a foundation of basic concepts and capabilities for the study of public policy, CIPA Fellows take three courses in each of the following three subject areas:

- Administration, Politics, and Public Policy
- Economics and Public Finance
- Quantitative Analysis

At least one of the three courses in each subject area must be a core foundation course—a course taught by a CIPA Core Faculty member.

Concentration Course Work

The M.P.A. program offers eight concentration options:

- Environmental Policy
- Finance and Fiscal Policy
- Government, Politics, and Policy Studies
- Human Rights and Social Justice
- International Development Studies
- Public and Nonprofit Management
- Science and Technology Policy
- Social Policy

During the latter half of the first year of course work, CIPA Fellows select a concentration. Concentrations are designed to help students organize and develop a particular area of study. Fellows are encouraged to pursue a broad range of interests within their choice of a concentration.

Internships and/or Off-Campus Study Options

CIPA Fellows are expected to engage in public-affairs work related to their respective areas of concentration during the summer between their first and second years of study. The objective is to gain pragmatic professional experience that will complement a student's formal academic study. CIPA's assistant director for professional development provides assistance to fellows in finding placements that match their interests, expertise, and professional goals. Appropriate internships are available in public policy– or public affairs–related organizations in both the public and private sector. Examples of placements include the following:

- the International Monetary Fund
- the Organization of American States
- the United Nations
- the United States Agency for International Development
- the United States Congress and Senate
- the World Bank
- state, local, and urban municipal governments
- nongovernmental organizations worldwide
- private sector consulting firms

CIPA Fellows also have the opportunity to gain professional experience off-campus, while taking a semester of courses for credit, through the following three programs:

- Rome Program
- Cornell in Washington
- Cornell in Nepal Study Program.

Professional Writing Requirement

As a culmination of studies in the M.P.A. program, each fellow develops and submits either a professional report or thesis. Typically, the report or thesis grows out of a fellow's specific area of concentration and often incorporates work done during the summer internship or an off-campus study program. Both the CIPA professional report and the thesis require the student to synthesize and apply his or her education to formulate a solution to a policy problem. The thesis places a greater emphasis on problem definition and literature review, while the professional report emphasizes feasibility, practitioner accessibility, and adapting a student's writing to the professional culture and standard practices of the client organization. The level of work expected for the M.P.A. thesis or professional report is equivalent to one or two semester-long courses.

Professional Student Activities

CIPA Fellows gain practical skills by organizing, managing, and participating in a variety of professional development activities. These provide fellows with opportunities to share work experience with other fellows, and to meet practitioners and distinguished faculty members in the field of public affairs. Fellows participate in one or more of the following activities for at least two semesters. These initiatives include:

- Colloquium and Conference Committee: This student group sets the agenda for the weekly Colloquium Series and makes arrangements for the chosen guest lecturers to come to campus.
- *Point of View (POV)*: The CIPA Public Affairs television program, POV is part talk show and part debate show. Fellows work in all aspects of TV production and presentation, gaining invaluable experience for the media exposure they will encounter as public-policy professionals.
- *The Current*: CIPA Fellows publish a journal of student policy research. Working on *The Current* offers fellows a firsthand view of the rigors of publishing academic work, and also provides a foundation in professional writing and editing—necessary skills for preparing reports and position papers, and publishing research findings.

Complementary Degrees

CIPA Fellows may elect to combine their M.P.A. program with study for a complementary degree such as a J.D. from the Cornell Law School, an M.B.A. from the Graduate School of Management, an M.M.H. from the Hotel School, or an M.R.P. in the field of City and Regional Planning. Admission to the complementary degree program is independent from admission into CIPA.

Accelerated Master's Program

An accelerated program for Cornell undergraduates allows advanced students to apply to CIPA in their junior year, begin CIPA-related course work in their senior year, and complete the M.P.A. in just one year beyond their undergraduate studies.

Residence Requirement

Fellows are required to spend four semesters of study in residence to complete the M.P.A. Those who enroll in the Cornell Accelerated Master's program can earn the equivalent of two semesters in residence during their senior year.

Admission

The CIPA program seeks diversity in its student body, drawing from a pool of applicants who have studied in a wide range of disciplines. No specific background or undergraduate major is required, although individuals with previous work experience in policy making or implementation are strongly encouraged to apply. Admission to CIPA is selective.

Decisions are based on:

- potential for public-policy leadership as evidenced by professional work; community, extracurricular, or other relevant experience
- an evaluation of the applicant's overall academic record
- GRE scores
- letters of recommendation
- an extensive written statement of purpose

Applicants for whom English is a second language will need to achieve a minimal TOEFL score of 250 (computer based) or 600 (paper based).

Although CIPA has a policy of rolling admission, applications should be submitted by March 1 to be considered for financial aid.

For an application or for more information, contact the Cornell Institute for Public Affairs, 294 Caldwell Hall (tel: 255–8018; fax: 255–5240; cipa@cornell.edu; www.cipa.cornell.edu).

Financial Aid

CIPA students fund their education by drawing on a variety of sources. Although the institute provides some partial fellowships, it is unable to provide full support for any individual student. Fellows often win support from Fulbright, Truman, or World Bank fellowships. In addition, Cornell offers numerous assistantship and employment opportunities for graduate students. Applicants are encouraged to explore all available sources of external funding, including grants that may be provided by current employers.

CORNELL PLANTATIONS

One Plantations Road
255-2400
plantations@cornell.edu
www.plantations.cornell.edu

Introduction

Cornell Plantations is Cornell University's arboretum, botanic garden, natural areas, and many on-campus gardens—places of exceptional beauty, diversity, and learning opportunities. Areas managed include over 4,000 acres of natural areas on and off campus in addition to the 150 acres in the F. R. Newman Arboretum and the 50 acres of botanical gardens in and around central campus.

Cornell Plantations provides unique outdoor laboratories and plant collections for Cornell's academic programs and research in disciplines such as ecology and evolutionary biology, landscape architecture, 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 natural areas for classes and research can be made by calling Cornell Plantations. Cornell Plantations has something for everyone! We're also the many places that non-horticultural students and faculty members visit for classes ranging from art, literature, and women's issues, to nutrition.

Credit Courses

Cornell Plantations offers three for-credit courses: HORT 480 Plantations Fall Lecture Series, HORT 485 Public Garden Management, and HORT 640 New Directions in Public Horticulture. HORT 480 is a 1-credit S-U lecture series offered each fall. HORT 485 is a 3-credit course offered alternate spring semesters. HORT 640 is a 1-credit S-U discussion course offered alternate spring semesters. Cornell Plantations also offers noncredit classes and workshops such as botanical illustration, arts and crafts, gardening techniques, and ecology walks; visit www.plantations.cornell.edu, or call 255-2400 for more information.

Internships

Cornell Plantations' internship program is just for you, the Cornell University student! Since the 1990s, more than 70 university students have been working side by side with Plantations' knowledgeable staff, learning and having fun. A number of positions in various areas are available each year, beginning after finals in May. All positions strive to build on classroom learning through hands-on work, encouraging students' interests in horticulture and the natural world.

Master's Program

Cornell Plantations' master of professional studies program offers fully funded fellowships in public garden management. Visit our web site for program details.

Planning a Visit

To discover all that is Cornell Plantations, visit www.plantations.cornell.edu or pick up a map or a copy of the *Cornell Plantations Path Guide* at the Visitor Resource Center and Garden Gift Shop in the Lewis Education Center just below Tower Road. The *Path Guide* and accompanying video are also available at the Cornell Store.

PROGRAM ON ETHICS AND 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 and 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 seeks 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").

For information regarding content or availability of EPL core/related courses, contact the academic department listed.

EPL Core Courses

PHIL 194/GOVT 294 Global Thinking
PHIL 242/GOVT 260 Social and Political Philosophy
PHIL 246/B&SOC 206/S&TS 206 Ethics and the Environment
PHIL 247 Ethics and Public Life
PHIL 342 Law, Society, and Morality
GOVT 466/LAW 648 Feminism and Gender Discrimination
GOVT 468 Global Climate and Global Justice
GOVT 491/691/PHIL 691 Normative Elements of International Relations

Related Courses

AN SC 414 Ethics and Animal Science
ENGRG 360/S&TS 360 Ethical and Social Issues in Engineering
PHIL 446 Topics in Social and Political Philosophy
ILRCB 482 Ethics at Work
ILRCB 488 Liberty and Justice for All
LAW 655 International Human Rights
LAW 667 Law and Ethics of Lawyering
LAW 718 Ethnic Conflict and International Law
LAW 748 Legal Ethics and Professionalism
MIL S 441 Leadership, Management, and Ethics for Junior Military Officers
NAV S 402 Leadership and Ethics
NBA 671 Business Ethics
NTRES 332 Introduction to Ethics and Environment
NTRES 433 Applied Environmental Philosophy
PAM 567 Health Policy
PHIL 145 Contemporary Moral Issues
PHIL 193 Inequality, Diversity, and Justice
PHIL 241 Ethics
PHIL 245 Ethics and Health Care
PHIL 341 Ethical Theory
PHIL 344 History of Ethics: Ancient and Medieval
PHIL 345 History of Ethics: Modern
PHIL 346 Modern Political Philosophy
PHIL 447 Contemporary Ethical Theory
PHIL 641 Ethics and Value Theory

Michele M. Moody-Adams, Wyn and William Y. Hutchinson Professor of Ethics and Public Life, and professor of philosophy; Burke Hendrix, assistant professor of government and assistant professor of ethics and public life; Henry Shue, professor of ethics and public life and professor of philosophy.

PROGRAM IN REAL ESTATE

114 West Sibley Hall
255-7110

The two-year master of professional studies in real estate (M.P.S./RE) degree program is an interdisciplinary 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 and industry-related real estate activities on and off campus. The field of real estate is a committee of faculty members selected from several different colleges that is directly involved in and responsible for the design, delivery, 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 contribute 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, the real estate development process, real estate finance and investments, managerial finance, residential development, real estate law, construction planning and operations, design in real estate development, and real estate marketing and management, along with a weekly industry seminar. Elective courses are taken in a chosen area of concentration, and there is a leadership and management distribution requirement. 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, sustainable development, property and asset management, real estate marketing and market analysis, or international real estate concentrations). Students complete real-world, semester-long project workshops during their second and final semesters.

Admissions

Applicants to the Program in Real Estate must have completed a bachelor's degree with a good academic record. Applicants must submit a résumé plus two letters of recommendation on appropriate letterhead either from faculty members familiar with the applicant's academic work, or if appropriate, professional recommendations based on work experience. Competitive scores for the GMAT are required. Extension and relevant work experience will receive favorable consideration. International students, for whom English is a second language, will need to achieve a minimum TOEFL score of 250 (computer based) or 600 (paper based). There is no work experience required for admission; however, it is strongly preferred that applicants have at least some work experience; three to five years has been typical. Applications are received on a rolling basis. To be considered for financial aid, applications must be received by January 15. Otherwise, please submit complete application by March 1. Wait list applications will be accepted until June 1. For more information, contact the graduate field coordinator at 255-7110, or 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 21st century.

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

- Graduate studies 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 such as environmental consulting and science writing.
- Graduate 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
   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 G 101/103 and 102/104 (or 105–106) or BIO G 109 and 110
2. Required introductory course: EAS 220 The Earth System
3. Science of Earth Systems Core Courses
   EAS 302 Evolution of the Earth System
   EAS 331/ASTRO 331 Climate Dynamics
   EAS 321/NTRES 321 Introduction to Biogeochemistry
4. Concentration Courses

Four intermediate to advanced-level courses (300 level and up) that build on the core courses and have prerequisites among the "Basic Math and Sciences" courses listed above. Note: Additional basic math and science courses may be required to complete the concentration courses; the specific courses will depend on the student's choice of concentration. These concentration courses build depth and provide the student with a specific expertise in some facet of earth system science. Possible areas of concentration include, but are not limited to, Ocean Sciences, Environmental Geology, Climate Dynamics, Biogeochemistry, Ecological Systems, Environmental Biophysics, Hydrological Systems, and Soil Science.

For more information contact Professor Bryan Isacks, Department of Earth and Atmospheric Science, bli1@cornell.edu, and visit www.eas.cornell.edu/eas/ses/SES.home.html.

DEPARTMENT OF STATISTICAL SCIENCE

301 Malott Hall
255-8066

M. T. Wells, chair (301 Malott Hall, 255-4388; R. L. Strawderman, director of graduate studies; J. A. Bunge, director of professional programs; T. Apanosovich, T. Berger, J. Booth, C. Bustamante, T. DiCiccio, R. Durrett, E. Dynkin, T. Fine, X. Guo, Y. Hong, J. T. G. Hwang, H. Kesten, N. Kiefer, G. Lawler, R. Nielsen, M. Nussbaum, P. Protter, S. Resnick, D. Ruppert, G. Samorodnitsky, S. J. Schwager (undergraduate coordinator), B. Turnbull, P. Velleman, A. Vidyashankar, 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 programs 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 offers an undergraduate major and minor in biometry and statistics through the Department of Biological Statistics and Computational Biology (BSCB) in the College of Agriculture and Life Sciences. It also offers a minor in Engineering Statistics through [the Department of] Operations Research and Industrial Engineering 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 statistical consulting service is offered by the faculty of BSCB. There is no charge to members of the Cornell community for using the Statistical Consulting Service. It provides guidance to researchers in a broad variety of fields on designing experiments, collecting and analyzing data, and drawing appropriate conclusions from the results of their studies. Statistical computing consulting is also available through the Office of Statistical Consulting, B21 Savage Hall, 255-1926.

The department is organized into four units: Biological Statistics, 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: Biological Statistics and Computational Biology (CALS), STBTRY; Engineering Statistics Unit (ENGR), STENGR; Mathematical Statistics Unit (ARTS), STMATH; Social Statistics Unit (ILR and ARTS), 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 201(2010) Introductory Statistics
This is an introduction to the basic concepts of probability, statistics and data analysis. Descriptive methods, normal theory models, and inferential procedures are considered. Topics include basic statistical designs, an introduction to probability, estimation, confidence intervals, tests of significance for a single population mean and proportion, the difference in two population means and proportions, ANOVA, multiple linear regression, contingency tables, and logistic regression.

ST 501–502(5010–5020) Applied Statistical Analysis
Two-semester core course for students in master of professional studies (M.P.S.) degree program in applied statistics in Department of Statistical Science. Prerequisite: enrollment in M.P.S. program. Consists of a series of modules on various topics in applied statistics. Some modules include guest lectures from practitioners. Parallel with the course, students complete a yearlong, in-depth data analysis project.

ST 501(5010) Applied Statistical Analysis
Letter grades 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(5020) Applied Statistical Analysis
Letter grades only.
Topics include, but are not limited to: sample surveys and questionnaire design, data sources, experimental design, and data mining.

ST 600(6000) Statistics Seminar
Fall and spring. 1 credit. Pre- or co-requisite: BTRY 409 or permission of instructor. S-U grades only.

Biological Statistics Unit

STBTRY 301 Biological Statistics I (enroll in BTRY 301)
STBTRY 302 Biological Statistics II (enroll in BTRY 302)
STBTRY 310 Statistical Sampling (enroll in BTRY 310)
STBTRY 382 Introduction to Statistical Genomics and Bioinformedics (enroll in BTRY 382)
STBTRY 408 Theory and Probability (enroll in BTRY 408)
STBTRY 409 Theory of Statistics (enroll in BTRY 409)
STBTRY 482 Statistical Genomics (enroll in BTRY 482)
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 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 672 Topics in Environmental Statistics (BTRY 672)]
STBTRY 682 Statistical Genomics (enroll in BTRY 682)
STBTRY 694 Graduate Special Topics in Survival Analysis (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 310 Introduction to Probability and Random Signals (enroll in ECE 310)
STENGR 360 Engineering Probability and Statistics II (enroll in ORIE 360)
STENGR 361 Introductory Engineering Stochastic Processes I (enroll in ORIE 361)
STENGR 411 Random Signals in Communications and Signal Processing (enroll in ECE 411)
STENGR 436 A Mathematical Examination of Fair Representation (enroll in ORIE 436)
STENGR 467 Telecommunication Systems I (enroll in ECE 467)
STENGR 473 Operations Research Tools for Financial Engineering (enroll in ORIE 473)
STENGR 474 Statistical Data Mining (enroll in ORIE 474)
STENGR 476 Applied Linear Statistical Models (enroll in ORIE 476)
STENGR 512 Fundamental Information Theory (enroll in ECE 562)
[STENGR 517 Feedforward Neural Networks (enroll in ECE 577)]
STENGR 523 Introductory Engineering Stochastic Processes I (enroll in ORIE 523)
STENGR 560 Engineering Probability and Statistics II (enroll in ORIE 560)
STENGR 561 Queuing Theory and Its Applications (enroll in ORIE 561)
STENGR 580 Simulation Modeling and Analysis (enroll in ORIE 580)
STENGR 650 Applied Stochastic Processes (enroll in ORIE 650)
STENGR 651 Probability (enroll in ORIE 651)
STENGR 665 Storage Data Communication Models (enroll in ORIE 665)
STENGR 670 Statistical Principles (enroll in ORIE 670)
STENGR 674 Statistical Learning Theory for Data Mining (enroll in ORIE 674)
STENGR 768 Selected Topics in Applied Probability (enroll in ORIE 768)
STENGR 778 Selected Topics in Applied Statistics (enroll in ORIE 778)

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 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 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 312 Applied Regression Methods (enroll in ILRST 312)
STSOC 319 Introduction to Statistics and Probability (enroll in ECON 319)
STSOC 320 Introduction to Econometrics II (enroll in ECON 320)
STSOC 321 Applied Econometrics II (enroll in ECON 321)
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 630 Econometrics II (enroll in ECON 620)
STSOC 639 Econometrics I (enroll in ECON 619)
STSOC 721 Time Series Econometrics (enroll in ECON 721)
STSOC 722 Semi/Nonparametric Econometrics (enroll in ECON 722)
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

AEM 410 Business Statistics
AEM 411 Introduction to Econometrics
AEM 417 Decision Models for Small and Large Business
AEM 710 Econometrics I
AEM 713 Quantitative Methods I
[BTRY 421 Matrix Computations]
[BTRY 726 Problems and Perspectives in Computational Molecular Biology]
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
D SOC 619 Research Design II
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
OR&IE 674 Statistical Learning Theory for Data Mining
OR&IE 468/568 Financial Engineering with Stochastic Calculus I
OR&IE 469/569 Financial Engineering with Stochastic Calculus II
OR&IE 576 Regression
OR&IE 464/566 Extreme Value Analysis with Applications to Finance and Data Communication
OR&IE 677 Sequential Methods in Statistics
PAM 215 Research Methods
PAM 230 Introduction to Policy Analysis
PAM 423 Risk Management and Policy
PHYS 316 Modern Physics I
PHYS 562 Statistical Physics
PHYS 574 Quantum Mechanics II
PSYCH 472 Multiple Regression

PSYCH 473 General Linear Model

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 664 Introduction to Epidemiology

VETPMD 665 Study Design

VETPMD 666 Advanced Methods in Epidemiology

Business and Preprofessional Study

UNDERGRADUATE BUSINESS STUDY

Cornell offers an accredited general undergraduate business degree program as well as world-renowned business-related programs in five other colleges and schools. Because the choices are so broad, students are encouraged to explore the offerings carefully to identify the program that best matches their business career goals. (Graduate study is available in the Johnson Graduate School of Management as well as in graduate fields associated with each of the undergraduate options.)

Applied economics and management The Department of Applied Economics and Management (AEM) in the College of Agriculture and Life Sciences is home to Cornell's general undergraduate business degree. Accredited by AACSB International—The Association to Advance Collegiate Schools of Business, AEM's undergraduate business program offers courses that prepare students for careers in finance, marketing, management, and business strategy. Students also may participate in AEM's specialized programs focusing on entrepreneurship, agribusiness, small business, and food industry management. Courses reflect the program's analytical, applied economics focus (business.aem.cornell.edu).

Arts and sciences Many of the liberal arts majors offered by the College of Arts and Sciences provide students with a background for a successful business career. In particular are majors in economics, mathematics, sociology, and psychology. Economics focuses on the production, distribution, and consumption of goods and services; monetary systems; and economic theories. Students interested in the human dimensions of business can choose sociology or psychology. Mathematics majors can choose concentrations in computer science, operations research, or economics to prepare for careers in areas such as actuarial science or finance (www.arts.cornell.edu).

Engineering Many of today's business managers hold engineering degrees. Each of the College of Engineering's 12 major fields prepares students for business careers. Operations research and engineering is the most business-oriented engineering field, preparing graduates for careers such as investment banking and process engineering. Engineering students in any field can take a business-oriented minor in areas such as industrial systems and information technology, and operations research and management science (www.engineering.cornell.edu).

Hotel administration The School of Hotel Administration, the world's leading hospitality management program, prepares students for management and entrepreneurial careers in businesses such as hotels, resorts, restaurants, amusement parks, sports arenas, cruise lines, and airlines. The school offers a rigorous business curriculum with courses in finance and real estate; hospitality facilities and operations; marketing, tourism, strategy, and information systems; and organizational management, communication, and law. The school's 150-room conference hotel gives students the opportunity to apply what they learn in a real-world business (www.hotelschool.cornell.edu).

Human ecology The College of Human Ecology offers three business-oriented majors. The textiles and apparel major prepares students for careers in the fashion industry, for example, as a retail executive or merchandise buyer. Students majoring in facility planning and management study interior design, management, environmental psychology, and real estate to pursue careers as facility planners and consultants. The policy analysis and management major offers concentrations focusing on health, consumers, and policy, and its graduates pursue careers as nonprofit managers, consumer advocates, and policy researchers (www.humec.cornell.edu).

Industrial and labor relations The School of Industrial and Labor Relations (ILR) focuses on the "people" side of business. Its professional-level curriculum provides a strong social science foundation in organizational behavior, human resource management, labor law, labor economics, history, and statistics. Students can then develop special interests in management, dispute resolution, negotiation, employee relations, labor unions, collective bargaining, public policy, and international labor issues. Most ILR graduates begin careers in areas such as management, consulting, and public policy, but about one-third go directly to law school (www.ilr.cornell.edu).

Related Areas

Entrepreneurship and Personal Enterprise Program This university-wide program is open to all Cornell students interested in eventually starting their own businesses or working for venture capital firms. A series of almost 50 linked entrepreneurship-related courses are offered by the above six colleges and schools as well as by the Johnson Graduate School of Management, the Law School, and the College of Veterinary Medicine (epe.cornell.edu).

International programs Several additional programs allow business students to focus on a particular geographic area. Concentrations are offered in Latin American Studies, Modern European Studies, East Asian Studies, South Asian Studies, Southeast Asian Studies, and Africana Studies (all in the College of Arts and Sciences). The College of Agriculture and Life Sciences offers an interdepartmental program in international agriculture.

COMBINED DEGREE PROGRAMS

Highly qualified undergraduates may co-register with the Johnson Graduate School of Management during their senior year, thereby earning their M.B.A. degree in less than the usual time. Students in all Cornell undergraduate colleges may explore this option. The College of Engineering allows qualified students to earn a B.S., M.B.A., and M. Eng. 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 course work.

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 apply and 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. In addition, members of the Cornell Law School faculty sometimes offer undergraduate courses such as The 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 particular undergraduate courses be completed. These courses usually include general chemistry and organic chemistry, biology, and physics, and all must be taken with a lab. A year of English composition (or a first-year writing seminar) is also required. 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 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.

PREVETERINARY STUDY

There is no specific preveterinary program at Cornell, and students interested in veterinary medicine as a career should select a major 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, NY 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, Cornell Career Services, 103 Barnes Hall, Ithaca, NY 14853-1601.