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Frank H. T. Rhodes, president
Robert Barker, provost
Thomas H. Meikle, Jr., provost for medical affairs
James E. Morley, Jr., senior vice president
Joseph M. Ballantyne, vice president for research and advanced studies
John F. Burness, vice president for university relations
William D. Gurowitz, vice president for campus relations
Robert M. Matyas, vice president for facilities and business operations
James E. Morley, Jr., acting vice president and treasurer
Richard M. Ramin, vice president for public affairs
James A. Sanderson, chief investment officer
Joycelyn R. Hart, associate vice president for human relations
Larry I. Palmer, vice provost for academic programs
Kenneth M. King, vice provost for computing
Malden C. Nesheim, vice president for budgeting and planning
Walter J. Relihan, Jr., university counsel and secretary of the corporation
Joseph B. Bugliari, dean of the University Faculty
Ithaca and the Finger Lakes

Cornell University started in a muddy field that had only one thing going for it: a phenomenal view. From a surprising number of points on campus you’ll take in an expanse that some find literally breathtaking. Cayuga, the largest of the Finger Lakes, dominates the scene, and its waters stretch some forty miles north of Ithaca, which is wrapped around the south end of the lake. Rolling hills surround the area, and ravines and gorges cut through the campus and the city of Ithaca, creating extraordinary waterfalls. And we’re not just talking about your one basic waterfall. There are 150 within ten miles of Ithaca, topped by Taughannock—at 215 feet, the highest falls in the Northeast.

Although waterfalls add a touch of wildness, the scenery in our area is more gentle than grand—with one exception. Sunsets can rival those in the southwestern United States. Blazing oranges, translucent purples, and deep scarlets regularly illuminate the sky, and eventually you’ll find yourself taking such spectacular beauty for granted.

And it doesn’t stop with sunsets. The tree-lined streets of Ithaca begin just after the campus ends, and the next street you come to could well be one filled with the gables and chimneys of Victorian architecture, just down the way from a house with a geodesic dome, which sits across the way from a rambling Tudor-like mansion. And the surprises continue, when you discover that an ordinary Ithaca road might spill onto a public footpath that leads to a spectacular falls overlook.

Ithaca is filled with fascinating streets and pathways that you’ll enjoy exploring when you have a couple of hours.

Putting the snowbelt in its place. We hold firmly to the concept of four seasons in the Ithaca area. The central New York State climate just might suit you if you like to smell the earth after a spring rain and take in the splendid golden and blue of early summer warmth along the lake, look forward to the russet and crimson of trees against a turquoise sky in autumn, and enjoy the clean, biting air of a walk—or a cross-country ski—in crisp, newly fallen snow.

While we’re on the subject of weather, let’s put one myth to rest. Ithaca, thankfully, isn’t in the snowbelt. That honor is reserved for places to the north and west of us. Cayuga Lake actually modifies winter’s worst weather. On the other hand, we don’t want you to think we don’t get some snow. We do—enough for winter recreation of all kinds, from skating to skiing and sledding—but not enough to be disabling. So when you hear the bleak reports about New York’s snowbelt on the evening news, forget it. That’s not us.

Ithaca—a city full of surprises. Before you go thinking that sunsets and waterfalls just aren’t enough for you, we’ll tell you that Ithaca is as cosmopolitan as you’d want a place to be, without the noise, grit, smog, and occasional mayhem of larger cities.

Indeed, we’ve got the better of some well-known places. You’ll be able to select nightly from more movies than are shown in Washington, D.C.; you can pick from several award-winning restaurants, along with imaginative and inexpensive eateries that offer everything from bagels and baklava to plantains and pistachios; and you’ll find the quirky stores that cater to the sophisticated sorts who live in academic communities. Examples? A cheese shop, where you can pick up a wedge of cheddar, some crackers, and fresh cider and head off to a nearby park for lunch. (There are three spectacular state parks within a few miles of us.) Or a secondhand bookstore where, among thirty thousand volumes, you might find the collected New Yorker essays of E. B. White (Cornell ’27) or one of the perennial bestsellers of Kurt Vonnegut (Cornell ’44). And that’s only one of Ithaca’s twenty-one bookstores. There’s a shop just for products made in New York State up the street from a deli with triple-decker sandwiches that compare (almost) to the best of New York City. There’s a news store where you can pick up a copy of Le Monde while you buy a tin of exotic Russian Caravan tea.

People from all around the world make Ithaca their base for good sailing. From sailboats to thirty-five-foot-plus ocean-going sailboats—you can see them all on Cayuga Lake. Water skiing, windsurfing, fishing, and swimming are open to those interested in making the most of a lake in their front yard.

And there’s more. Ithaca has an opera company, a ballet troupe, a fistful of theater groups, and community choruses. In addition to being the home of an accomplished chamber orchestra, it offers some of the best jazz in the country.

You get the idea. Ithaca is a cosmopolitan collection of people, theaters, shops, businesses, and architecture that’s inextricably woven together with Cornell. But be careful: there’s always so much going on in Ithaca and on the Cornell campus that you may end up settling here. A surprising number of Cornell grads do just that. After four years you may be tempted to join them.

If you want to read more about Ithaca, you can find it thinly veiled as the fictional Corinth in The War between the Tates, by Pulitzer Prize-winning author (and Cornell professor) Alison Lurie. You can see it portrayed in the 1986 movie The Manhattan Project or barely disguised in Richard Farina’s classic, Been Down So Long It Looks like Up to Me. In fact, so many well-known authors have lived in Ithaca at one time or another that there’s a guidebook available about who lived where, when.

Being fair to the rest of the country. Now we admit there may be times when you want to run off to New York City. Fair enough—most Cornell students “road trip” once or twice a semester. We’re about four and a half hours from New York City by car or a quick hour by plane. Philadelphia is a mere two hundred miles from us; Washington and Boston are roughly three hundred—an easy day’s drive. The nearest cities are Syracuse and Rochester, each a little more than an hour away. Chicago is a long day’s drive but certainly doable. By plane, car, or bus, you can easily get to Ithaca from just about anywhere in the United States or the world.
The Cornell Campus

Most of us have a picture of an ideal college campus in our minds. Formed partly by movies, partly by recollections of parents, older brothers and sisters, and friends, the classic image of stone buildings grouped around a green quad festooned with shade trees and ivy has stuck with us for a long time. It's a compelling vision.

If you're looking for that "ideal" campus, Cornell won't disappoint you, but in our 740 acres you'll also find a lot more—some that you'll probably like and some that (to be candid) you probably won't. From the geometric precision and cleanness of twentieth-century architecture to the stately arches of collegiate Gothic, the Cornell campus refuses to be defined in conventional terms. Why? For the answer, we have to get down to basics about Cornell University.

Back to the future. College education, in mid-nineteenth-century America, largely consisted of propelling bright young people through a dry-as-dust classical curriculum. Educators knew things needed fixing, but they settled for complaining about the status quo. Enter Ezra Cornell. A man with a considerable fortune and the cranky single-mindedness to put it to good use, Cornell thought that students like you—intelligent and quick-witted—could make reasonable decisions and deserved to choose their own field of study. So far, so good. Now enter Andrew White, a man who had long dreamed about creating a great new American university. A scholar and able administrator, he was inflamed by the radical genius of Cornell's idea, a university where students could find instruction in anything that interested them.

So from the beginning Cornell University was an upstart. The history of this place shows that it has been daring and different—by design. And it continues to be so today. High in the hills above the city of Ithaca, Cornell sits where Ezra Cornell was determined, despite strong opposition, to locate it, smack in the middle of his farm. The silhouette of Cornell University poised above the lake is a heart-tugging one. We wouldn't trade our location for any other in the world.

Square one. The first university building, Cascadilla Hall, still stands, in the southwest corner of the campus. Now a popular residence hall, once it was all of Cornell—classrooms, faculty living quarters, dorm rooms, and offices. But Cornell's popularity demanded that the university expand quickly. A flurry of construction ended in the creation of what's now called the Arts Quad.

The home of the College of Arts and Sciences, the quad is a place you'll come to know well. Uris Library, with Cornell's famous bell tower at one corner of it, may well be the only college library in which a murder mystery was set. All angles, peaks, and arches, the undergraduate library has been remodeled many times since its creation in 1870, and the latest addition, a stunning, mostly underground reading room, is an example of how old and new architecture live happily together on the campus. Right across from Uris is Olin, the main graduate library—open to all undergraduates as well. Most of Cornell's more than five million volumes and 56,000 serials are housed here. Olin also has world-renowned collections of Wordsworth and Petrarch, matchless holdings in Southeast Asian materials, and, just to be different, a world-class witchcraft collection, begun by Andrew White, a passionate bibliophile.

On the east side of the Arts Quad looms Goldwin Smith Hall, named for the Regius Professor of History at Oxford in the 1860s who was lured to Cornell by its ground-breaking experiment in freedom of academic choice. Smith was a politically radical scholar who came to Ithaca, fell under its spell, and never returned to England. During his long life this provocative thinker wrote thousands of pamphlets, brochures, and broadsides, from "Is There Another Life?" to "Has The American Senate Decayed?"—provoked Disraeli, the Tory prime minister of England, by his extreme liberalism; and influenced generations of students. If you want to look at this great man, you can see his likeness in a bust to the left of the staircase in the entrance hall of his building.

At the north end of the Arts Quad is Sibley, home of the College of Architecture, Art, and Planning. The impressive dome that caps Sibley is actually an illusion, a clever turn-of-the-century architectural device to join two buildings. Sibley houses spacious classrooms, offices, a superb fine arts library, and a café—the Green Dragon—for a quick sandwich between classes. The fine arts department can be found in nearby Olive Tjaden Hall, named after Olive Tjaden Van Sickel (Cornell '25), the first woman elected to the American Institute of Architects.

Not far away is the headquarters of the College of Agriculture and Life Sciences—commonly called the Ag Quad. Anchored by Mann Library, with its superb holdings in agriculture, biology, human development, and other social sciences, the quad is graced by several of Cornell's many gardens. To the east is a cluster of buildings that span the diverse interests of the college itself, ending with Boyce Thompson Institute, home to more plant scientists than any other place in the world (to pick just one eye-opening statistic).

To the north is the College of Human Ecology, housed in Martha Van Rensselaer Hall. The building is named after the redoubtable woman who, in the early part of this century, successfully impressed Cornell, New York State, and the United States government by her single-minded desire to ensure that human concerns stood on an equal footing with other fields of study. In addition to the classrooms and offices of the college, Martha Van has a lively cafeteria where you can get a meal or just a cup of coffee.

Not far from the hum ec college is pint-sized Beebe Lake. Edged with pine trees and circled by footpaths, Beebe is a romantic and quiet place to get away from the hustle and bustle of the quads—and a super place to jog.

If you turn south again and wander along footpaths, you'll get back to the Arts Quad. Just to the southeast is the School of Industrial and Labor Relations, the first such school in this country. Ives Hall wraps around a peaceful green courtyard where, on warm spring days, you'll find students lounging and eating picnic lunches. A stone's throw away is the School of Hotel Administration, appropriately housed in Statler Hall. Part of Statler is under construction now, but the dramatic new addition, to be completed in 1988, will be a nine-story state-of-the-art hotel, conference center, and restaurant, office, and classroom complex.

Across the way from Statler is the Engineering Quad, a cluster of buildings grouped around a spacious green field and sitting beside Cascadilla gorge. On the quad you'll find a striking and elegant sundial, accurate to the second, designed and built by a former Cornell president who was an engineer by training. Several spectacular new additions to the quad are now under construction, and you'll see the results in 1988.

If all that isn't enough, the Cornell campus is made even richer and livelier by the presence of four graduate divisions—the Law School, the Graduate School, the Johnson Graduate School of Management, and the College of Veterinary Medicine, all of which attract scholars from the world over.

In this brief tour we haven't even touched on the Cornell Plantations, 2,800 acres of woodlands, trails, streams, and gorges, chock-full of special gardens devoted solely to herbs, peonies, wildflowers, alpine plants, roses, rhododendrons, and (strangely enough) poisonous plants. We've also left out the delights and
diversions of Willard Straight Hall—one of our three student unions—where you can lounge in a chair with a juicy novel from the New York Times best-seller list; buy some just-baked chocolate-chip cookies at our award-winning bakery, Straight from the Oven; borrow a choice videotape from the Cornell film library; pick up the latest Rolling Stone from the newsstand; down a lemonade and popcorn from the Country Market; buy tickets to a production of Theatre Cornell; or settle down to lunch in one of the Straight's two restaurants.

We haven't told you about Sapsucker Woods and Cornell's Laboratory of Ornithology either. The 180-acre wildlife sanctuary, just three miles from campus, is home to Canada geese, wood ducks, great blue herons, and others. And we've neglected the residence halls that crisscross the campus, from highrises with spectacular views to sprawling Gothic dorms centered around courtyards.

All that—and more. We've barely scratched the surface of the Cornell campus, but perhaps you've had a hint of the variety and charm it holds. The incidents of history you read about earlier shaped the Cornell campus you see today—one that many believe to be the most beautiful in the United States. We hope you'll agree.

...And Perhaps Cornell

This is a true story. Some years ago a foreign writer authored a critical review of American higher education. In it he claimed that only a handful of American colleges and universities—"Harvard, Yale, Princeton, and perhaps Cornell"—were places of any great distinction. Morris Bishop, renowned historian and Cornell University chronicler, took volatile and eloquent exception.

"Perhaps Cornell! It has always been the fate of our University to be Perhaps Cornell! A part neither of the aristocratic tradition of the original colonies nor the educational democracy of the great West...stoutly liberal and strangely conservative....Should we complain because our Alma Mater has found no fixed and sure classification in the educational world? Why no, I should think not....It may be that foreign observers hunting the essentially American college will specify Cornell University. And perhaps Harvard, Yale, and Princeton." How did Cornell—paradox, paradigm, and paragon all at once—come to defy pigeonholing? Why has it been called the first truly American university?

A university that refuses to be categorized. When Ezra Cornell was ready to give a half-million dollars to begin this university almost 120 years ago, the state of New York agreed to pitch in some of its own funds. Because of that partnership, three of Cornell's seven undergraduate colleges have a connection to New York State ("state-supported" is the term we use) and four are independent ("privately endowed"). That dual heritage allows you to tap into the quality and humanism of an Ivy League education coupled with the vitality, spirit, and commitment to public service of the great state universities. It makes a remarkable difference. Cornell is made up of so many students, from all fifty states and more than ninety foreign countries, that you can forget trying to classify them into preppies, jocks, artsy types, whatever. We drive to distraction those who try to stereotype universities and colleges, because we break every mold. We just can't be labeled.

4,000 reasons Cornell is unique—and then a few more. With more than four thousand courses offered each year by nearly a hundred departments, at Cornell you can shape and fine-tune, to an extraordinary degree, your own academic life. Cornell students learn Swahili (we teach forty languages) and study the Arabic short story, explore the possibilities of life on other planets (exobiology), and grapple with the theory of nonlinear elasticity. They paint, tend bees, design computer systems and theater costumes, dig for ancient artifacts here and abroad, and do labor-relations fieldwork for major corporations. Engineers take courses in the fine arts; musicians confront (and occasionally revel in) computer science; nutrition majors crunch numbers in statistics courses. Cornell students don't draw lines between academic areas—they draw connections. It's in the nature of the place. A few examples:

The world first. If you're ready for a semester or two in Britain, Denmark, Egypt, Israel, France, Germany, Italy, Spain, or Switzerland, Cornell Abroad will help you get there. The Southeast Asia Program gives you access to a full spectrum of disciplines, from agricultural economics to linguistics, planning, and rural sociology; it also teaches Burmese, Cambodian, Cebuano, Indonesian, Javanese, Tagalog, Thai, and Vietnamese. Our Africana Studies and Research Center is the headquarters for study in the history, intellectual development, and social organization of Black people in the Americas, Africa, and the Caribbean. You can major in Africana studies or pursue a joint major with another field in the humanities. The Cornell-in-Washington program lets you pursue your interests—politics, architecture, planning, human development and family studies, or agricultural economics, to name just a few—in the nation's capital, through internships, seminars, or courses. And we're in D.C. to stay. We have our own Cornell Center on O Street, right in the heart of things.

Now to links in fields of study. We probably have more interdisciplinary programs than any university in the country, because Cornell's faculty believes that barriers between academic disciplines are of no service to scholarship. Interdisciplinary programs are formal ways of crossing lines between fields. Here are just a few examples: In the Law and Society Program you'll delve into the field of law from the perspective of the humanities and the social sciences, in such courses as Power and Culture, Ancient Greek Constitutions, Legal Anthropology, and Crime and Punishment: From the Puritans to Mickey Spillane. The Program on Science, Technology, and Society takes the serious concerns facing the world, from arms control and national defense policies to biomedical ethics and technological literacy, and brings them directly to you in the classroom. If your interests are slightly more specific, you might look into medieval studies, women's studies, or peace studies, each of which approaches its subject from multiple critical perspectives.
Because the world today demands educated men and women who have both a wide grasp of issues and technical competence, narrow specializations without the balance of interdisciplinary perspective and breadth have no place at Cornell. We make it easy for you to acquire that perspective by offering you the resources and stimulation of the entire university. You’re not carefully roped off from faculty, materials, equipment, or labs at Cornell; you’re encouraged to make use of them. And our facilities are, as you’d expect, the best—from an impressive array of computers (supercomputer to mainframe to micros) to the fifteen libraries across the campus.

The faculty members here reflect the best in teaching, research, and scholarship. That makes a difference to your education. To select just one statistic, Cornell ranks first in the nation in research funding from the National Science Foundation. Professors active and interested in keeping on top of their fields will bring the latest advances and groundbreaking discoveries to the classroom—and to you. At a university with six national research centers (more than any other institution in the country) those advances keep coming. Another fertile payoff of research: in the College of Arts and Sciences alone, roughly two hundred new courses are proposed every year. After all, research in its truest sense is the creation of new knowledge.

High-powered faculty members aren’t sequestered away from undergraduate classrooms. Nobel Prize winners teach freshman-level courses, and junior faculty members lead upper-level seminars, for a good reason: it works. The shoulder rubbing and coffee drinking that go on at Cornell among professors, advanced students, and undergraduates create a true university—a community of scholars. Ezra Cornell wouldn’t have it any other way.

Seven could be your lucky number.
Cornell is made up of seven undergraduate schools and colleges. (Don’t worry about the terminology. Essentially, there’s no difference between schools and colleges.) They are the College of Agriculture and Life Sciences; the College of Architecture, Art, and Planning; the College of Arts and Sciences; the College of Engineering; the School of Hotel Administration; the College of Human Ecology; and the School of Industrial and Labor Relations.

Now we come to the heart of the matter: what’s in this seven-college business for you? As we hinted above, the extraordinary breadth allows you to tailor-make your undergraduate career. For example, if you major in psychology in the arts college, you can flesh out your schedule with courses in developmental and environmental psychology in the human ecology college, sign up for classes in industrial psychology offered by ILR, and explore educational psychology classes in the ag college. Cornell encourages you—expects you—to make those cross-college connections.

If you’re the kind of student Cornell attracts, you have the confidence to begin to set priorities, the savvy to choose wisely from various attractive alternatives, and the wisdom to structure your education in a way that fits you to grapple with life after Ithaca. We call that freedom of choice—and it can be a heady experience. Here at Cornell we don’t think we do you a favor if we say: “Want to be a chemistry major? Sign that form and follow the prescribed courses on it. After four years, you’ll be a chemist. And good luck.”

Don’t misunderstand us. We’ll give you plenty of advice, if you’d like, in the shape of academic advisers; and make suggestions, when you want them; and tell you how other students have done things. And, believe us, your friends will tell you how they’ve done things. But you’re at the heart of this—we believe in you and your ability to come shining through in a world of choices, opportunities, and freedom. When you leave Cornell after graduation, you’ll hit the ground running, and no one will be able to stop you.

A Cornell education: spanning the centuries and shaping the future.
You’ve probably heard a great deal recently about the importance of a liberal arts education. From Newsweek articles to the oratory of members of Congress, it’s fashionable to extol the virtues of the liberal arts—in a society that has perhaps never been more work-centered than it is now. Why isn’t that a contradiction? Why are the abilities that are called into play when learning German, discussing the causes of the French Revolution, or analyzing the properties of mercury the very ones that help you succeed in this tough world of competition, fast track, and the bottom line? For the answer we have to reach back into history, to the Big Four and the Little Three.

The artes liberales, to give the subject under discussion its formal name, were classically defined as training worthy of free people. For years the training was divided into the quadrivium (arithmetic, music, geometry, and astronomy) and the trivium (grammar, rhetoric, and logic). The systematic study of those subjects was thought to hone the mind by developing the skills of analysis, judgment, organization, and abstract conceptualization. Only by fully cultivating those abilities, the reasoning goes, can a person really be ready for whatever life offers.

On the other hand, the artes serviles, an early kind of vocational education, fitted a person only for an immediate job or task. In effect, the narrow study bound a person to a particular function—inextricably—thus the “servile.” A modern equivalent would be the training that leads to the correct attaching of one part of a widget to another. By being educated only to perform those specific tasks, the widget-trained person has little that can carry over into another line of work, should the popularity of widgets plummet.

The moral of the story: A desire to rocket through four years of education by only taking courses in an equally narrow—although real—field is just plain shortsighted.

Employment forecasters tell us nearly 70 percent of the jobs in the twenty-first century have yet to be created. In this turbulently changing environment the educated person is one who easily learns new skills and deftly analyzes new information. The broad perspective you need to carry you confidently through the changes and upheavals of the late twentieth century is one grounded firmly in the liberal arts.

Cornell puts that argument into practice by building into your education a strong component of liberal arts, to provide an unshakable foundation for whatever field or profession you choose to pursue. No matter what college you make your home, you’ll spend a portion of your time with courses offered in the College of Arts and Sciences. We think that’s only fair to you—and your future. You’ll find yourself drawing connections between your liberal arts courses and your more professional courses. You’ll begin to see that areas of knowledge can’t be roped off neatly one from another, that the training that makes, for example, a capable engineer needs to be founded on that which makes a good human being.

We’ve concentrated on taking the liberal arts to the marketplace. But what is peculiar to an educated person is the capability of recognizing something in knowledge beyond its immediate utilitarian value. Before being swayed by the immediate “marketability” of an undergraduate professional degree, consider what you enjoy. Loving a subject, no matter how apparently “unmarketable,” is reason enough for pursuing it.

If you worry about your future after Cornell, you’ll be surprised at some of the career choices we can suggest for every imaginable major. Formally, there are scores of people at Cornell who will help you link your major to a profession. Informally, you have access to a world-
wide network of Cornellians—called the Cornell Connection—whose delight it will be to help you get started up the ladder.

A last word. No matter what college you land in at Cornell, in your liberal arts courses you’ll be learning about yourself and your relationship to the rest of the world. Κατανοείτε και ορίστε—know yourself—the Greeks carved on the temple at Delphi. After more than two thousand years it’s still the best advice around.

Still Have Questions? Read This.

Q. When I choose a college, does that mean I live and maybe eat and socialize just with the people in my college?
A. Absolutely not. You choose a college that’s closest to your interests, but you live, eat, and play with students in every college—in other words, with Cornellians. (That’s a word you’ll see a lot—it’s an easy way of referring to all Cornell students, past and present.)

Here’s an example: Let’s say you’re good in math and things mechanical, and you choose the College of Engineering. Don’t worry—you’ll undoubtedly sign up for courses in some of the other six colleges while you’re here. You may live in a dorm room next to a student in architecture, art, and planning. You may be in the pep band with hotelies and aggies. Your best friend may be a hum eccie majoring in design and environmental analysis.

Look at it this way: a college may, to some extent, define what you do, but it doesn’t limit who you are. Cornell is determined to offer you almost limitless opportunities.

Q. Help! I found that I can prepare for business in more than one college. What happens now?
A. Cornell gives you the opportunity to shape that general interest in a particular and personal way. Here’s how: As you read the descriptions of the colleges, you’ll find Cornell gives you six choices for study in business. One choice is the School of Industrial and Labor Relations, where there’s an emphasis on the social and economic aspects of business, with particular attention given to labor relations. A different option is the College of Human Ecology, with its roster of business-oriented courses focused on the consumer aspects of economic systems or preparation for management in the apparel or textile industries. Or you’ll find in the College of Agriculture and Life Sciences courses in everything from business management and financial accounting to marketing and business law, emphasizing the application of economics to management. And the College of Arts and Sciences offers you a comprehensive roster of courses in economics, with emphases in money, banking, and public finance, as well as international and comparative economics. In the School of Hotel Administration—yet another choice—you can focus on mid- and upper-level management education in the hospitality industry. Finally, study in the area of operations research and industrial engineering in the College of Engineering can help you climb the ladder of technological management in an increasingly technical world.

There you have it—six choices that allow you to define your interest in business in a way that’s tailor-made for you. And remember, at Cornell you choose a college only as your base of operation. You’re free to take courses from all the others, so don’t think that you wave good-bye to consumer economics courses in the College of Human Ecology if you choose the School of Industrial and Labor Relations as your home base.

Q. When do I have to decide what college at Cornell I want?
A. To be safe, by mid-November. Here’s why: Part 1 is the beginning of the application process. It gives us official notice that you’re applying to Cornell. As soon as we get part 1, we send you part 2, the rest of the Cornell application (school forms, essay questions, and so on), which is due back by January 1.

Another reminder about part 1: Instead of having you apply for admission to Cornell University, we’ve tried to make things more personal. You apply to the college that’s closest to your interests. A college can give your application more attention than one large university committee can. Since you choose a college as your home base, your application is considered by the faculty and staff with whom you’ll be most closely associated, and you compete only with students applying to the same college. Because of that, we ask you to tell us what college you’re interested in on part 1 of the admission application in this book. If you have a change of heart, you can switch your college choice on part 2.

Q. What if I’m not sure what I want to study? Or what if I think I know and then change my mind?
A. It’s all right not to know what you want. College is a time for exploration, and there’s no reason to lock yourself in to a major if you aren’t ready. The first thing to do is determine the college that interests you most. If you find you’re drawn to the College of Arts and Sciences or Human Ecology, those colleges offer you the option of saying “undecided” on part 1 of the application. If your interests pull you to one of the other colleges, see if you can locate a major field that comes close to what you like, and check that box under the college of your choice. Remember, you can change your mind about your major. You may discover that after all these years of dreaming about being an archaeologist you don’t like what goes into making one. Find that out now. There
can't be many things much worse than heading off each morning to a job you don't really like. If you change your mind, Cornell will help. We'll sit down with you to determine where your new direction will take you. It can be a fairly simple matter to change colleges at Cornell, or it may take a semester or two. But 10 to 15 percent of Cornell students do it—so don't worry. Choose your college, your field, and relax.

Q. I'm interested in medicine, and I'm thinking of becoming a doctor. Where do I start?
A. You have quite a bit of latitude to shape your program to your interests, but you'll be taking a hefty portion of science courses—biology and chemistry in particular. Medical schools don't look for a particular major or a rigid series of courses, but they do look for high grades in the science classes you undertake, and in general, they'll expect your transcript to demonstrate solid achievement in all your courses.

Almost any college at Cornell is "right" for premedical students (premeds). You should look carefully at the descriptions and find the one that's closest to your interests. Students from departments throughout the university go on to medical schools across the country, and one out of every five students at Cornell considers himself or herself a premed.

Q. Does each college have separate buildings and classrooms? Are they all on the campus?
A. Each college has its own definable area of the campus; some colleges are centered in one building, others in a group of buildings on a quad. Depending on how you arrange your schedule, you'll be in and out of a variety of buildings for your classes, unless you're spending a semester or two out in the world, taking advantage of Cornell's impressive off-campus programs—from Albany, New York, and Washington, D.C., to all across Europe. About the college quads and classroom buildings: along with the libraries, residence halls, athletic facilities, unions, concert halls, and laboratories, they are the Cornell campus, and it's all yours to take advantage of as a Cornell student.

Q. I'm really interested in a career in law. Are there requirements I need to meet?
A. First of all, there are no set programs for entrance to law school. Law schools don't require particular courses. They're interested in strong analytical skills and breadth of education, shaped to your particular interests. Plan on taking courses that develop your powers of precise analytical thinking and proficiency in writing and speaking, do well in those courses, and you'll have the best shot of getting into law school.

Q. I'm thinking of pursuing biology, and it's in a couple of colleges. What should I do?
A. To make sure you'll get the best of what Cornell offers, we've brought together all the professors who teach in this area into a single unit—the Division of Biological Sciences. At Cornell you can study almost any aspect of biology: molecular biology, field biology, and everything in between. The faculty members—more than a hundred in the division—are mainly drawn from agriculture and life sciences, arts and sciences, and veterinary medicine.

What you need to do now is choose your home college, because both the ag college and the arts college offer a biology major. The courses in the major are the same, though requirements and electives differ. You'll probably choose the ag college if your interests include microbiology, natural resources, animal sciences, communication, and business. If you want your biology laced with more history, foreign languages, physics, music, and literature, you'll probably want the arts college. But whether you choose agriculture or arts, know that the Division of Biological Sciences will become your key to unlocking all the biological riches of Cornell.

Q. Will I feel a part of Cornell no matter what college I choose? I mean, are all colleges really Cornell?
A. Absolutely. There is no Cornell somewhere out there other than the Cornell created by the weaving together of the seven colleges. From the beginning Cornell has been more than just a federation of colleges, yet the university can't be defined without them. Although the colleges are the foundation on which Cornell University rests, it is Cornell that's emblazoned on your degree, it is Cornell whose alma mater will (we promise) make your eyes misty, and it is perhaps Cornell where you belong.
Cornell University Calendar 1987–88

Fall Semester

Sunday, August 23
Friday, August 28
Monday, August 31
Monday, September 7
Friday, September 18
Friday—Sunday, September 18–20
Saturday, October 10
Saturday, October 17
Wednesday, October 21
Monday—Friday, October 26–November 6
Wednesday, November 25
Monday, November 30
Wednesday, December 9
Thursday—Sunday, December 10–13
Monday, December 14
Wednesday, December 23

New-student orientation begins
Residence halls open
Registration
Instruction begins, 7:30 a.m.
Add/drop/change period begins
Physical education classes begin
Last day of add/drop/change period
Last day for late registration
New-Student Parents’ Weekend
Homecoming Weekend
Fall recess: instruction suspended, 1:10 p.m.
Instruction resumes, 7:30 a.m.
Pre-course enrollment for spring 1988
Thanksgiving recess: instruction suspended, 1:10 p.m.
Instruction resumes, 7:30 a.m.
Instruction ends, 1:10 p.m.
Study period
Final examinations begin
Final examinations end
Residence halls close

Winter Session

Variable periods between Monday, December 28, and Wednesday, January 20

Spring Semester

Monday, January 18
Tuesday, January 19
Thursday and Friday, January 21 and 22
Monday, January 25
Monday, February 8
Friday, February 12
Saturday, March 19
Monday, March 28
Monday—Friday, April 4–15
Saturday, May 7
Sunday—Wednesday, May 8–11
Thursday, May 12
Saturday, May 21
Sunday—Saturday, May 22–28
Sunday, May 29

Residence halls open for continuing students
Residence halls open for new students
Registration
Instruction begins, 7:30 a.m.
Add/drop/change period begins
Physical education classes begin
Last day of add/drop/change period
Spring recess: instruction suspended, 1:10 p.m.
Instruction resumes, 7:30 a.m.
Pre-course enrollment for fall 1988
Instruction ends, 1:10 p.m.
Study period
Final examinations begin
Final examinations end
Residence halls close (students who are graduating may stay through Commencement)
Senior week
Commencement

Summer Session 1988

Three-Week Session
Eight-Week Session
Six-Week Session

Wednesday, June 1—Friday, June 24
Monday, June 13—Tuesday, August 9
Monday, June 27—Tuesday, August 9

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 on religious holidays. It is the intent of the university that students missing classes due to the observance of religious holidays be given ample opportunity to make up 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.

The Students

Cornell University has a student body of about 18,000, which includes seven undergraduate divisions of about 13,000 students and four graduate divisions of about 5,000 students in Ithaca. The undergraduate student body is diverse in interests and background, with 51 percent of the undergraduates from New York State, 44 percent from the remaining fifty states, and 4 percent from approximately one hundred foreign countries.

Regional Origin of Students

<table>
<thead>
<tr>
<th>Region</th>
<th>Students</th>
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</thead>
<tbody>
<tr>
<td>New England</td>
<td>1,738</td>
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<tr>
<td>New York State</td>
<td>8,033</td>
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<tr>
<td>Mid-Atlantic</td>
<td>2,404</td>
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<tr>
<td>Southeast</td>
<td>759</td>
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<tr>
<td>Midwest</td>
<td>1,142</td>
</tr>
<tr>
<td>Southwest/Mountain</td>
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<tr>
<td>Far west</td>
<td>1,044</td>
</tr>
<tr>
<td>Foreign and United States possessions</td>
<td>1,211</td>
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<tr>
<td>Unknown</td>
<td>1,374</td>
</tr>
<tr>
<td><strong>Total enrollment</strong></td>
<td><strong>17,904</strong></td>
</tr>
</tbody>
</table>

*Figures are for fall 1986 and do not include extramural students, students registered in absentia, or students in the New York City divisions.

It is the policy of Cornell University actively to support equality of educational and employment opportunity. No person shall be denied admission to any educational program or activity or be denied employment on the basis of any illegally prohibited discrimination involving, but not limited to, such factors as race, color, creed, religion, national or ethnic origin, sex, age, or handicap. The university is committed to the maintenance of affirmative action programs that will assure the continuation of such equality of opportunity.

Cornell University is committed to assisting those handicapped students who have special needs. A brochure describing services for the handicapped student may be obtained by writing to the Office of Equal Opportunity, Cornell University, 234 Day Hall, Ithaca, New York 14853-2801. Other questions or requests for special assistance may also be directed to that office.

Retention and Graduation of Undergraduates

By fall 1986, 82 percent of the first-time freshmen who entered the endowed undergraduate units in fall 1980 (Architecture, Art, and Planning; Arts and Sciences; Engineering, and Hotel Administration) had graduated. In the statutory units (Agriculture and Life Sciences, Human Ecology, and Industrial and Labor Relations), 83 percent of the first-time freshmen who entered in fall 1980 had graduated.
University Resources

Students benefit from a wide variety of resources, both human and physical, that contribute significantly to their Cornell education. The following sections provide an idea of some of the more intriguing and stimulating possibilities.

University Libraries

Cornell University has one of the leading academic library systems in the United States. Its fifteen campus libraries contain over five million volumes and subscribe to fifty-six thousand periodicals. The libraries provide the facilities for research and study in hundreds of undergraduate major subject areas and in over eighty-five fields of study for advanced degrees.

All students at Cornell are entitled to use any of the libraries on campus, although access to the stacks may be limited in some cases. Students are particularly encouraged to participate in the orientation sessions and tours offered at the beginning of each semester by the larger campus libraries. Schedules and many large department libraries are available on every library.

At the south end of the Arts Quadrangle is Uris Library, the building with the tower that has become the symbol of Cornell. Uris is essentially a library for undergraduates in the liberal arts. A principal aim of this library is to provide books close together as possible. Accordingly, the stacks, containing more than 14,000 volumes, are open to all, and only reserve books in heavy demand are held in a special category. There are listening rooms where students can hear recordings of the spoken word, and there is a lecture room with sound and projection capabilities.

Across the walk from Uris is the John M. Olin Library, devoted more specifically to graduate and faculty research. This closed-stack library houses many special collections of books and manuscripts, among them rare books, collections on East and Southeast Asia, the Icelandic Collection, the History of Science Collections, the archives of the university, maps, microfilms, and newspaper.

The two libraries, Uris and Olin, complement each other in support of the university's program of teaching and scholarship. In addition to these facilities, there is an extensive system of college and school libraries. Chief among them is the Albert R. Mann Library, serving the New York State Colleges of Agriculture and Life Sciences, and Human Ecology. Located at the east end of the Agriculture Quadrangle, Mann Library's open stacks hold half a million volumes and are a research library of the Division of Biological Sciences.

Other college libraries are the Fine Arts Library, serving the College of Architecture, Art, and Planning; the libraries of the College of Engineering and the New York State College of Veterinary Medicine; and the libraries that serve the Johnson Graduate School of Management, the Law School, the School of Hotel Administration, and the New York State School of Industrial and Labor Relations. In addition, there are many large department libraries on the campus. For more specific information, see Libraries at Cornell, available at all libraries.

Many of the libraries have special copying services, audiovisual facilities, bibliographic retrieval services, study rooms, microform and microfiche readers, typewriters, and interlibrary loan services, and some publish handbooks and bibliographies that are distributed without charge. Available in all the libraries are directories of subject locations, hours, and services.

Museums and Art Exhibitions

The Herbert F. Johnson Museum of Art is recognized as one of the country's leading university art museums. Designed by world-renowned architect I. M. Pei, the building's upper-level galleries provide sweeping views of Cornell, Ithaca, Cayuga Lake, and the surrounding countryside.

The collections include paintings, drawings, sculpture, photographs, prints, textiles, and crafts spanning thirty centuries and six continents. They are particularly strong in Asian, nineteenth-century American, graphic, and contemporary art. In addition, the museum presents approximately fifteen special exhibitions each year as well as many lectures, art demonstrations, film screenings, workshops, music and dance performances, and other programs.

Student membership in the museum is $15. Members receive a subscription to the bimonthly newsletter, invitations to opening receptions and special programs, discounts on catalogs and posters, and other benefits.

Located on the corner of Central and University avenues, the museum is open Tuesday through Sunday from 10:00 a.m. to 5:00 p.m. Admission is free. For further information call 255-6464.

Art exhibitions. Cornell is generously supplied with art exhibitions, some permanent and some temporary. The displays range from the works of students and visiting collections to the permanent university collection housed at the Herbert F. Johnson Museum of Art. Other campus locations for art displays include the Art Room in William Hall, the Hallart Gallery in Sibley Hall, and the galleries in Goldwin Smith Hall, Martha Van Rensselaer Hall, and Olive Tjaden Hall.

Music

Students who want to participate in music making will find a wide range of opportunity through the Sage Chapel Choir, the Cornell Chorus, the University Glee Club, the university orchestras and bands, chamber music ensembles, the Opera Workshop, the Collegium Musicum, the Jazz Ensemble, and the Indonesian Gamelan. The university chimes, housed in McGraw Tower, are rung by students.

The University Faculty Committee on Music sponsors programs by visiting soloists and major orchestras in the Bailey Hall Concert Series, string quartets and other chamber music ensembles in the Statler Series at the Alice Statler Auditorium, and occasional operas, ballets, and special events. The Department of Music presents nearly a hundred concerts, recitals, and other events each academic year, most free of charge. These include performances by members of the faculty, students, visiting artists, and department ensembles, as well as lectures by visiting musicians and scholars. Many take place in the Barnes Hall auditorium, and they include a wide variety of music from both Western and non-Western traditions.

The Cornell Concert Commission offers a series of student-produced popular concerts. Other student organizations have regular performances of Gilbert and Sullivan operettas, jazz, and folk music.

Astronomy

Cornell has a vigorous Department of Astronomy oriented towards research in modern astrophysical topics. Cornell operates two local optical observatories, the Fueters Observatory (near the North Campus area) and the Hartung Bookhoyd Observatory, and the world's largest radio-telescope, in Arecibo, Puerto Rico.

The Spacecraft Planetary Imaging Facility, a joint undertaking of NASA's Planetary Geology Program and the university, serves as a focal point for planetary studies at Cornell. The facility contains a comprehensive collection of tens of thousands of images obtained by United States planetary and lunar spacecraft, as well as related cartographic and support data. Cornell astronomers have also played a major role in research in infrared astronomy from space, including the highly successful infrared astronomical satellite, and are currently involved in the construction of NASA's space infrared telescope. The department operates several computers, including two VAX 11/750s with high-resolution color graphics.

Study and research is focused on several broad areas, including theoretical astrophysics, infrared astronomy, planetary sciences, and radio-television astronomy.

Theater

Cornell students have numerous opportunities to attend or participate in theatrical productions. The Department of Theatre Arts presents a full season of classical, modern, experimental, and musical dramas. All students in the university are encouraged to become involved in the productions as actors, crew members, stage managers, or assistant directors. Projects frequently include guest professionals as well as graduate actors from the professional actor training program of the Department of Theatre Arts. Interested students should call the department for production details and audition dates. Many exciting theater projects are also carried out each semester by the undergraduate theater organization, the Cornell Dramatic Club.

Other theatrical opportunities can be found at Risley Residential College, which has a small theater available for student productions; with the Cornell Savoyards, who produce two Gilbert and Sullivan operettas annually; and within the Ithaca community, which has several theater groups that mount various productions during the year.

Dance

The dance program, cosponsored by the Departments of Theatre Arts and Physical Education and Athletics, offers a range of possibilities for students interested in dance. Work by faculty, student, and guest choreographers is presented during the year by means of informal studio presentations as well as fully produced performances. The dance program also sponsors a series of performances by professional touring companies. The Ithaca community includes several studios that present workshops and performances in a wide range of dance forms.

Students interested in social and ethnic dance will find that dancing is a popular activity. Student organizations sponsor folk, contra, and square dances frequently. Most dances are taught at these events, and beginners are welcome.

Films

Throughout the year and on almost every night of the week, single film showings and film series make available educational and entertaining films at reduced rates. In addition, there are a half dozen commercial theaters in Ithaca itself, making moviegoing among the most popular leisure-time activities.

Students interested in producing their own films may participate in the filmmaking program sponsored by the Department of Theatre Arts.
Lectures
On the more academic side of audience entertainment, there is the lecture. Dozens of extracurricular lectures are given every year, ranging from scholarly presentations on subjects of narrow interest to lectures by well-known speakers with campground appeal.

Publications
Cornell students edit and publish a wide variety of publications, including a yearbook, literary magazines, and a number of magazines related to special fields of interest. Students are in complete charge of the publication of the Cornell Daily Sun, an independent daily newspaper.

Special Facilities for Research
Major Cornell research facilities are located in the Medical College in New York City, which also houses the Graduate School of Medical Sciences. These institutions provide opportunities for research in areas of basic biomedical science, such as biochemistry, biometry, cell biology, genetics, immunology, microbiology, molecular biology, neurobiology and behavior, pathology, pharmacology, and physiology. A number of major research centers funded by the National Institutes of Health and also located in the Medical College offer opportunities for both basic and clinical research on AIDS, burns and trauma, hypertension, the immunology of aging, and stroke and thrombosis. In addition, there are active research programs in endocrinology, both adult and pediatric; infectious diseases, nephrology (including transplantation immunology); and neurosciences including neuroanatomy, neuroendocrinology, neurochemistry, psychopharmacology, and neuroradiology, with major facilities for magnetic resonance imaging. At the Westchester Division, located in White Plains, New York, an NIH-funded Center for Sleep Disorders conducts research in chronobiology. Other facilities at Cornell, mostly located in Ithaca, offer faculty members and students a range of opportunities. There are six national research centers at Cornell (the Center for Theory and Simulation in Science and Engineering, the Laboratory of Nuclear Studies, the Cornell High Energy Synchrotron Source, the National Astronomy and Ionosphere Center, the National Research and Resource Facility for Submicron Structures, and the Mathematical Sciences Institute), which are open to researchers from around the country; these are unique national resources that are primarily oriented to research by the Cornell faculty. Some of these and other Cornell research centers are described below.

Agricultural and Biological Sciences
Bradford Hall houses computers, radar, and other specialized equipment used in making up-to-the-minute weather forecasts. The insect collection, newly housed in Academic II, contains more than four million specimens, making it one of the largest university insect collections anywhere. Liberty Hyde Bailey Hortorium is the world's leading center for the study of plants, a plant family second only to grasses in economic importance. The Department of Food Science operates a full-scale dairy plant and a salesroom.

Cornell University is the New York State Center for Advanced Technology for Biotechnology (Agriculture) and the United States Army Research Center of Excellence in Biotechnology and operates the Biotechnology Institute, all of which support basic research in cell biology and molecular genetics with application to plants, animals, and cell production.

The Corson and Mudd buildings, a complex for biological sciences, house many different controlled environments: cold rooms, chambers controllable for constant light, humidity, and temperature; aquarium rooms; rooms for electron microscopy; and anechoic chambers, among other facilities.

The new Academic II building provides modern facilities for the Department of Biophysics in the biological sciences, and Media Services.

The Department of Plant Breeding, Plant Pathology, Floriculture and Ornamental Horticulture, and Vegetable Crops; the Section of Plant Biology, housed in the Plant Science Building, Gunterman Laboratories, and Bradford Hall, the Botany Theoretical Institute for Plant Research, which is housed in facilities on Tower Road; and the Agricultural Experiment Station at Geneva give the university the largest concentration of plant scientists in the world.

The New York State Agricultural Experiment Station at Geneva is renowned for research on fruits and vegetables. The seven-hundred-acre campus, located fifty miles from Ithaca, has excellent facilities for carrying out research on horticulture, plant pathology, and food science. Many graduate students conduct their research at the experiment station under the guidance of the sixty-six resident faculty members.

Near the campus are a 180-acre, university-affiliated bird sanctuary, Sapsucker Woods, and the Laboratory of Ornithology, and the Cornell Plantations, which has trails through natural areas and special collections, including peonies, rhododendrons, nut trees, an herb garden, a wildflower garden, and seasonal plantings.

Cornell's unique location, on Cayuga Lake and between Cascadilla and Fall creeks, offers many opportunities to explore ecology and aquatic science. The Fisheries and Ecotoxicology laboratories and experimental ponds are located near the campus; an additional one hundred ponds are located near the Tompkins County Airport. A major toxicology facility, the Equine Drug Testing Laboratory of the New York State School of Veterinary Medicine, is also situated near the airport about three miles from campus. Twenty-five miles away the four-thousand-acre Arnot Forest serves as an outdoor laboratory in wildlife and forestry for the Department of Natural Resources, which also operates a two-hundred-acre maple sugar and forestry extension field station at Lake Placid and the Cornell Biological Field Station at Shackleton Point on Oneida Lake near Syracuse. The latter not only provides excellent facilities for fisheries and aquatic science research and teaching but is also a research station of mussels, meadowlarks, and forest for terrestrial ecology and conservation studies.

The Animal Science Teaching and Research Center was established in 1973 on twenty-five hundred acres of fertile valley and hillside land near Dryden, about fifteen miles from campus. It now houses some seven hundred head of dairy cattle, 300 beef cattle, 400 sheep, and an aquaculture facility for brook trout. About one thousand acres of corn and grasses are planted and harvested each year.

A new Large Animal Research and Teaching Unit on campus greatly expands the research on, and teaching of, metabolic control of growth and lactation in large animals.

The orchard laboratory conducts research on fruit crops; the popular salesroom may be reached by campus bus.

Other renowned off-campus facilities include Shoals Marine Laboratory, a marine biology laboratory six miles of the Maine and New Hampshire coasts.

Engineering and Physical Sciences
The National Research and Resource Facility for Submicron Structures is one of the newest research facilities on campus. It is expected to have a profound effect on submicron technology; it is housed in the Computer-Aided Design Instructional Facility, is available for teaching.

The world's largest radio-radar telescope, in the Arecibo Observatory in Puerto Rico, is operated by Cornell University through the National Astronomy and Ionosphere Center in Ithaca.

Social Sciences
Uni Hall (Department of Psychology) houses the human experimental laboratory, laboratories in biopsychology and social psychology, and the Eleanor J. Gibson Laboratory of Developmental Psychology, which explores the development of perception in infants.

Laboratories and observational facilities in Martha Van Rhensieler Hall (Department of Human Development and Family Studies) facilitate research in infant and child development, both normal and abnormal. A laboratory nursery school provides opportunities for research involving preschool children and early-childhood education.

The Cornell Institute for Social and Economic Research (CISER) supports the research activities undertaken both by its own programs and by the more than 250 individual researchers affiliated with the institute. Many Institute resources and services are also available to all Cornell researchers and students with social science interests. Some special technical services are available for a fee. CISER services include the CISER data archive, which provides central access and management for social science data to researchers; computing support; a computing facility for social science research developed and maintained in cooperation with Cornell Computer Services, which are located in Martha Van
Rensselaer and Uris Halls, a microcomputer evaluation and development facility located in Warren Hall, and a survey research facility that provides operational support for faculty members, students, and administrators.

Computer Services
At Cornell, computers are used by musicologists, archaeologists, historians, engineers, architects, writers, linguists, accountants, doctors, scientists, students, and faculty members in every discipline. Cornell Computer Services (CCS) supplies and maintains computer hardware, operating systems, and general and specialized programs to meet a broad spectrum of user needs. To make these resources readily accessible, CCS operates public terminals and microcomputer facilities, provides some free consulting services, produces informative documentation, and offers a variety of user education programs.

Cornell’s main computers consist of large-scale IBM computers, a VAX 8500, two MicroVAX IIs, and two VAX 11/750s. Public terminal clusters are located in seventeen different areas on and off campus, and they house approximately 360 workstations, including more than 250 microcomputers. The number of public microcomputers will continue to increase. Computer graphics equipment in Uris Hall and a laser printer in Warren Hall are available for public use.

Grants from IBM and Apple Computer have provided microcomputers and related equipment and intensive support to develop academic software and to implement use of microcomputers in the classroom.

Cornell is one of five institutions in the country to house a national advanced scientific computing center (supercomputer) and the first to become fully operational. Initial configuration included an IBM 3084QX mainframe computer and four FPS-264 array processors. The next-generation machine, the IBM 3090-400, succeeded the 3084QX in fall 1986.

Cornell is attached to Telenet and TYMNET, which allow the central Cornell computers to be accessed by a local telephone call from all fifty states, Mexico, Canada, and Europe. As a member-supplier of EDUNET, Cornell shares computer resources with other universities, colleges, and nonprofit groups associated with higher education and research. Cornell is also a member of BITNET and MAILNET, providing two-way "electronic mail" service between Cornell and other universities.

Degree Programs

Undergraduate Degrees
The undergraduate curricula at Cornell University lead to the Bachelor of Arts (A.B.) degree in the College of Arts and Sciences or the Bachelor of Science (B.S.) degree, offered by the College of Agriculture and Life Sciences, the College of Human Ecology, the School of Hotel Administration, the College of Engineering, and the School of Industrial and Labor Relations. The College of Architecture, Art, and Planning offers the Bachelor of Architecture (B.Arch.), the Bachelor of Fine Arts (B.F.A.), and the Bachelor of Science (B.S.) degrees.

Graduate Degrees
The graduate program at Cornell, with its emphasis on flexibility and independence, permits an unusual degree of accommodation to the needs and interests of the individual student. Most graduate degrees are offered through the Graduate School. Professional graduate degrees are offered through the professional schools and colleges. More information on the graduate degrees offered by Cornell may be found in the section on the Johnson Graduate School of Management, the Graduate School, the Law School, and the New York State College of Veterinary Medicine.

Division of Unclassified Students
The Division of Unclassified Students (DUS) assists Cornell undergraduates in transferring between colleges of the university when direct internal transfer is not possible. The division also serves as a counseling agency for students whose academic and career goals have changed. Such students are advised about alternatives within the Cornell system.

To apply to the division, students must
1) Make an appointment for an interview in DUS (telephone: 255-4386)
2) Complete the DUS application form and return it to the division office, 158 Olin Hall
3) Submit Application for Transfer coupons to their college registrar, requesting transfer to DUS

Candidates are admitted to the division when, in the judgment of the DUS Administrative Committee, there is reasonable evidence that a transfer can be accomplished and that the proposed program is consistent with the student’s stated objectives. Students are admitted for one semester but may be allowed to continue in the division for a second term if that is necessary and the student is making progress toward transfer.
Business and Preprofessional Study

Undergraduate Business Study

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

The areas most often pursued include applied economics and business management (College of Agriculture and Life Sciences), economics (College of Arts and Sciences), engineering, hotel administration, consumer economics and housing (College of Human Ecology), and industrial and labor relations.

Applied economics and business management. Agricultural economics, business management and marketing, farm business management and finance, food-industry management, public affairs management, and resource economics are the areas available. There is more emphasis on the application of these areas than on the theoretical aspects of economic theory and money, currency, and banking. (These subjects would be more easily pursued in the Department of Economics.) Instruction is appropriate for both agricultural and nonagricultural pursuits.

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

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

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

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

Industrial and labor relations. The world of work, especially the employee-employer relationship in the broadest sense, including the political, social, and economic forces affecting that relationship, is studied. Graduates can pursue immediate employment in industry, government, and labor organizations or choose graduate study in industrial and labor relations or such related fields as law, business, and public administration.

Related Areas

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

Combined Degree Programs

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

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. However, law students should be guided by certain principles 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. Freshman writing seminars, required of nearly all Cornell freshmen, 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 and jurisprudence.
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 to 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 practicing 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 tasks 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 successful career.

The presence of the Cornell Law School on campus provides the opportunity for a limited number of highly qualified undergraduates registered in the College of Arts and Sciences at the university to be admitted to the Law School. At the time of entry they must have completed 105 of the 120 credits required for the Bachelor of Arts degree, including 92 credits of course work in the College of Arts and Sciences. It may be possible for exceptionally well qualified students in other Cornell undergraduate colleges to arrange for a limited number of courses to be taken in the Law School. The College of Human Ecology offers a program in which students spend their fourth year at the Law School. In addition, members of the Cornell Law School faculty often offer undergraduate courses such as Nature, Functions, and Limits of Law, which are open to all undergraduates.

Premedical Study

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

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

Qualified students in the Colleges of Agriculture and Life Sciences, Arts and Sciences, and Human Ecology may apply for acceptance into a double-registration program arranged between Cornell University and Cornell University Medical College in New York City. This program allows registered students to save one year in pursuit of the bachelor's and M.D. degrees. Further information about this program is available from the Health Careers Program office at the Career Center, Cornell University, 203 Barnes Hall, Ithaca, New York 14853-1601.
Preveterinary Study

There is no specific preveterinary program at Cornell, and students interested in veterinary medicine as a career should select an area for study that fits their interests while at the same time meeting the entrance requirements for veterinary college 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 is not accepted into 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 New York State College of Veterinary Medicine at Cornell are English, biology or zoology, physics, inorganic chemistry, organic chemistry, biochemistry, and microbiology. All science courses must include a laboratory. The college also requires demonstrated proficiency in written and spoken English and encourages college-level work in mathematics. These requirements, necessary for admission to the New York State College of Veterinary Medicine at Cornell, may vary slightly at other veterinary colleges.

For information on additional preparation, including work experience and necessary examinations, students should consult the brochure Admission to the New York State College of Veterinary Medicine, obtained by writing to the Office of Admissions, New York State College of Veterinary Medicine, Cornell University, C117 Schuman Hall, Ithaca, New York 14853-6401.

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 New York State College of Veterinary Medicine at Cornell. This program allows registered students to save one year in pursuit of the bachelor's and D.V.M. degrees. Further information about this program is available from the Health Careers Program office at the Career Center, Cornell University, 203 Barnes Hall, Ithaca, New York 14853-1601.

Interdisciplinary Centers and Programs

Africana Studies and Research Center

For information about the programs and courses offered by the center, see the section "Special Programs and Interdisciplinary Studies" in the course listings for the College of Arts and Sciences.

Faculty Roster

Adams, Anne, Ph.D., U. of Michigan, Ann Arbor. Prof., Africana Studies and Research Center
Cross, William E., Ph.D., Princeton U. Assoc. Prof., Africana Studies and Research Center
Edmondsdon, Locksley G., Ph.D., Queens U. (Canada). Visiting Prof., Africana Studies and Research Center
Gates, Henry L., Ph.D., Cambridge U. (England). Prof., English/Africana Studies/Comparative Literature
Harris, Robert L., Ph.D., Northwestern U. Assoc. Prof., Africana Studies and Research Center
Turner, James E., Ph.D., Union Grad. Sch. at Antioch Coll. Assoc. Prof., Africana Studies and Research Center

Adjunct Faculty

ben-Jochannan, Yosef, Ph.D., Cambridge University. Adjunct Prof., Africana Studies and Research Center
Nanj, Abdul, M.A. S.U.N.Y., Adjunct Instructor, Africana Studies and Research Center

Andrew D. White Professors-at-Large

Urie Bronfenbrenner, chairman, G60e Van Rensselaer Hall

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 visiting scholars who would periodically visit the university in order to supplement the activities of the permanent university faculty. Professors-at-large, who serve for a six-year term, are full members of the faculty when in residence.

Term Ending in 1987

Antonioni, Michelangelo, film director
Greengard, Paul, neurophysiologist. Rockefeller University
Lovasz, Laszlo, mathematician. Eotvos Lorand University, Budapest
Rich, Adrienne, poet

Term Ending in 1988

Baxandall, Michael, art historian. The Warburg Institute
Borlaug, Norman E., plant scientist. International Maize and Wheat Improvement Center, Mexico
Derrida, Jacques, philosopher and literary critic. Ecole des Hautes Etudes en Sciences Sociales, Paris
Garwin, Richard L., physicist. IBM Thomas J. Watson Research Center
Shaw, Margery W., geneticist, physician, lawyer. University of Texas Health Science Center, Houston

Term Ending in 1989

Cox, David R., statistician. Imperial College of Science and Technology, London

Dover, Sir Kenneth, classicist. Former president, Corpus Christi College, Oxford
Sarkowski, John L., historian of science. University of California, Berkeley
Lewis, Bernard, Islamicist. Princeton University
Welty, Eudora, novelist and short story writer

Term Ending in 1990

Heilbronn, John L., historian of science. University of California, Berkeley
Rutter, Michael, psychiatrist. Institute of Psychiatry, University of London
Southwood, Sir Richard, biologist. Linacre Professor of Zoology, Oxford

Common Learning Courses

The objective of Common Learning courses is to enable students to acquire new knowledge about problems of significance to contemporary society and to examine these problems from a variety of intellectual perspectives. This dual objective implies challenging students to learn to define problems, gather relevant evidence, organize and interrelate materials, and present findings and conclusions both orally and in writing. The findings should include a systematic evaluation of alternative solutions, including assessment of their social and ethical implications. At every stage of the inquiry, course activities are expected to adhere to the canons of evidence and reason.

Common Learning courses are open only to juniors and seniors but will include students from a diversity of majors and a range of schools and colleges. Class size normally does not exceed twenty students. The limitation on class size and the diversity of students should encourage undergraduates with different training and interests to exchange knowledge with each other as well as with the professor responsible for the course. Courses are designed and taught by a single member of the faculty, although consultation with, and course participation by, colleagues in other disciplines are expected and encouraged. Titles of courses given to date are listed below. Some of these will be offered again in 1987–88 along with other new courses. For titles and descriptions of courses to be given in 1987–88 consult the office of the vice provost for undergraduate education, 309 Day Hall.

Courses

The Conflict between Science and Religion (History 448)

The Course of Science (Astronomy 315)

The Global City: People, Production, and Planning in Third World Metropolises (City and Regional Planning 377)

Health and Disease (German Literature 327, Biology and Society 327, and Psychology 387)

The Herodotean Moment: The Uses and Abuses of "Western Civilization" (History 454 and Government 454)

Human Development in Postindustrialized Societies (Human Development and Family Studies 485 and Psychology 485)
Income Distribution and Economic Justice (Economics 305)
The Power of Nationalism: Expressions of National Feelings in Politics, Music, and Literature (Russian Literature 390)
Rhythms: Their Significance in Biology, Psychology, Anthropology, Music, and Other Studies (Music 312)
Science and the Computer (Computer Science 405)
Science, Risk, and Public Policy (Engineering 400 and Environmental Policy 488)
Science, Technology, and the American Economy (Industrial and Labor Relations 451)
Signs and Communication (Comparative Literature 408 and Linguistics 408)
Teaching and Learning: Ideas of Education in the Western Tradition (Comparative Literature 387, Government 405, and Russian Literature 387)
Telling Lives: Narrative as a Basic Way of Representing Experience (English 475)
Work, Identity, and the Nature of American Community (Industrial and Labor Relations 683)

Cornell-in-Washington Program
Cornell-in-Washington is a program of instruction, research, and externships in the nation's capital. The program is open to qualified juniors, seniors, and graduate students from all participating colleges and schools, and divisions of the university. Full academic credit can be earned for the semester. Programs are offered in public policy and architecture. Public policy students enroll in Government 500 (Human Development and Family Studies 404/City and Regional Planning 719), which involves a major research study carried out through an externship, and the Workshop in Analytic Methods (Government 400.6). Students may work as externs with congressional committee offices, executive-branch agencies, interest groups, research institutions, and other organizations involved in the political process and public policy. Students also select one or two other seminars from such fields as government, history, economics, human development and family studies, architectural history, city and regional planning, natural resources, and sociology. A description of the architecture program may be found in the College of Architecture, Art, and Planning section. All seminars are taught by Cornell faculty and carry appropriate credit towards fulfillment of major, distribution, and other academic requirements.

A limited number of apartments may be rented at the Cornell Center, 2148 0 St., NW, Washington, D.C. 20037. All are fully furnished (except for dishes, linens, and bedding) and reasonably priced by Washington standards.

Further information concerning externships, courses, and other features of the program may be obtained from the Cornell-in-Washington office at 125 McGraw Hall (telephone: 255-4090) or by contacting the Cornell Center in Washington, 2148 O Street, NW, Washington, DC 20037 (telephone: 202/465-2184).

Center for Environmental Research
Neil Orloff, director; Hollister Hall, 255-7535
The Center for Environmental Research (CER) serves all segments of the university. It promotes and coordinates a comprehensive program of interdisciplinary research, teaching, and public service activities relating to environmental topics. CER's four major programs are (1) ecosystems research, conducted and coordinated by the Ecosystems Research Center, an Environmental Protection Agency/Cornell-funded center whose ecosystems orientation and expertise support EPA's regulatory activities; (2) teaching, research, and extension activities conducted by the Cornell Laboratory for Environmental Applications of Remote Sensing; (3) research and seminars conducted by the Environmental Law and Policy program, focusing on risk perception and management and regulation of toxic substances; and (4) water resources research and public service activities conducted by the Water Resources Program and as the New York State Water Resources Research Institute. In addition, the center publishes Environmental Update, a quarterly publication on environmental research and activities at Cornell, and Synopsis, a series of monographs on water quality management topics. CER also conducts seminars and symposiums in all of the four program areas listed above.

Courses
Although CER does not itself engage in teaching, courses relevant to the programs are offered in appropriate departments: (1) ecology through the Department of Biological Sciences; (2) remote sensing through the Departments of Agronomy and Environmental Engineering; (3) water resources primarily through the Departments of Agricultural Engineering, Agronomy, and Environmental Engineering; and (4) environmental law and policy by the Departments of City and Regional Planning, Agricultural Economics, Environmental Engineering, and Natural Resources; the Program on Science, Technology, and Society in its biology and society major; and the Law School.

Because courses relating to environmental law and policy are not indexed by this title, below are listed representative courses that should be of interest to individuals concerned with environmental law and policy:

- Religion, Ethics, and the Environment (Natural Resources 407)
- Seminar in Environmental Values (Natural Resources 672)
- Legal Aspects of Land-Use Planning (City and Regional Planning 653)
- Land Resources Protection Law (City and Regional Planning 656)
- Historic Preservation Law (City and Regional Planning 663)
- Public Policy and Preservation Planning (City and Regional Planning 683)
- Environmental Politics (City and Regional Planning 480)
- Environmental Law, Policy, and Management (City and Regional Planning 666)
- Environmental Ethics (Philosophy 246 and Biological Sciences 208)
- Economic Analysis of Government (Civil and Environmental Engineering 322 and Economics 308)
- Contemporary Issues in Environmental Law and Policy (Civil and Environmental Engineering 520)
- Water Law (Civil and Environmental Engineering 521 and Toxicology 625)
- Environmental Law II (Civil and Environmental Engineering 526)
- Regulation of Toxic Substances (Civil and Environmental Engineering 527)

Program in the History and Philosophy of Science and Technology
L. Pearce Williams and Martin Harwit, codirectors
The Program in the History and Philosophy of Science and Technology is an interdisciplinary academic unit dedicated to providing links between the sciences, engineering, and the humanities. It offers an undergraduate concentration and a graduate field program leading to both the M.A. and Ph.D. degrees. Faculty are drawn from diverse departments, disciplines, and colleges.

Undergraduate Concentration
The basic aim of the concentration is to expose science students to the philosophical and historical foundations of their sciences and students of the humanities to the development of the sciences and their effects on the modern world. The history and philosophy of science and technology provide the meeting point of these two aims. Students concentrating in this area must complete the following courses or arrange with their adviser in the program a comparable set of courses:

1) History 281-282, Science in Western Civilization (Peter Dear, history); or History 287-288, History of Biology in Relation to Culture (Will Provine, history and biological sciences)
2) Philosophy 381, Philosophy of Science (Richard Boyd, philosophy)
3) Architecture 561, Building Technology in Western Civilization (Thomas Peters, architecture), or History 380, Social History of Western Technology (John Weiss, history)
4) One seminar or other advanced course drawn from the list on file in the program office

Students majoring in the humanities are strongly urged either to deepen their knowledge of science by taking a second course in the science they took to fulfill the science requirement, or to broaden their knowledge by taking a second introductory course in another science.

Graduate Studies
Graduate students in the field are encouraged to work closely with scientists, engineers, and humanists. Although the Field of the History and Philosophy of Science and Technology has no specific course requirements, each student working toward the Ph.D. degree will be expected to show proficiency equivalent to:

1) four graduate-level semester-long courses in the branch of science or engineering of prime importance to subsequent thesis work
2) two semester-long courses in history
3) three semester-long courses in philosophy

History and philosophy courses in various specialties are frequently offered by other departments in addition to those of history and philosophy.

Center for International Studies
The Center for International Studies, 170 Uris Hall, is a university unit dedicated to the support and development of Cornell's international and comparative programs. Serving as an administrative base and clearinghouse for programs, information, and new initiatives in international studies, the center is particularly committed to the development of multidisciplinary, intercollege educational and research activities.

The center sponsors and coordinates international area studies and topical programs as well as international undergraduate educational programs such as Cornell Abroad and Cornell International Internships.

The center also sponsors the Field of International Development, a program leading to a professional master's degree, and an undergraduate concentration in international relations.

CIS Area Programs and Topical Programs
China-Japan Program (140 Uris Hall)
Latin American Studies Program (190 Uris Hall)
South Asia Program (170 Uris Hall)
Southeast Asia Program (120 Uris Hall)
Committees on Soviet Studies (190 Uris Hall)
Western Societies Program (17 Stimson Hall)
Comparative Economic Development (486 Uris Hall)
Comparative Studies in Professionalism and Professional Education (170 Uris Hall)
International Agriculture Program (261 Roberts Hall)
International Legal Studies (309 Myron Taylor Hall)
Program in International Nutrition (160 Uris Hall)
International Political Economy (170 Uris Hall)
International Population Program (372 Uris Hall)
Peace Studies Program (180 Uris Hall)
Rural Development Committee (170 Uris Hall)
International Studies in Planning (200 West Sibley Hall)
Institute for African Development (160 Uris Hall)

Current programs coordinated by the Center for International Studies include the following:

**Cornell Abroad (130 Uris Hall)**

One major function of the center is the university-wide coordination of international academic experiences for undergraduate students. Cornell Abroad (Cornell-sponsored study abroad program) began operation in 1985 and now has program sites in England, Scotland, Germany, Spain, France, Denmark, Israel, and Egypt.

**International Internships Program (130C Uris Hall)**

An international internships program for undergraduate and graduate students that gives students preprofessional experience in international settings. Admission is by application only and requires proficiency in a foreign language. Internship sites are in Venezuela, Mexico, West Germany, and Spain. Additional sites are also being developed. The program is open to students in all fields of study.

**Master of Professional Studies in International Development (170 Uris Hall)**

A program intended for midcareer practitioners is sponsored by the center and leads to a Master of Professional Studies in International Development. Interested individuals should apply through the Graduate School.

**International Relations Concentration (160 Uris Hall)**

Undergraduates interested in an international relations concentration should see Professor Katzenstein.

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**Center for Applied Mathematics**

The Center for Applied Mathematics administers a broadly based interdepartmental graduate program that provides opportunities for study and research over a wide range of the mathematical sciences. This program is based on a solid foundation in analysis, algebra, and methods of applied mathematics. The remainder of the graduate student’s program is designed by the student and his or her Special Committee. For detailed information on opportunities for graduate study in applied mathematics, students should contact the director of the Center for Applied Mathematics, Sage 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. (Abbreviations: Bio S = Biological Sciences, Chem E = Chemical Engineering, CS = Computer Science, EE = Electrical Engineering, M&AE = Mechanical and Aerospace Engineering, OR & IE = Operations Research and Industrial Engineering, and T&AM = Theoretical and Applied Mechanics.)

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**Selected Applied Mathematics Courses**

**Basic Graduate Courses in Applied Mathematics (and Analysis)**

Math 413–414 Introduction to Analysis
Math 433–434 Introduction to Algebra
Math 511–512 Real and Complex Analysis
Math 521 Measure Theory and Lebesgue Integration
Math 522 Applied Functional Analysis
Math 531–532 Algebra
Math 551 Introductory Algebraic Topology
Math 515–516 Mathematical Methods in Physics

**T&AM 613–616 Methods of Applied Mathematics**

**Analysis (and Differential Equations)**

Math 517–518 (also Math 427) Ordinary Differential Equations
Math 519–520 (also Math 428) Partial Differential Equations
Math 552 Differentiable Manifolds
Math 611–612 Seminar in Analysis
Math 613 Functional Analysis
Math 615 Fourier Analysis
Math 620 Riemann Surfaces
Math 623 Several Complex Variables
Math 627–628 Seminar in Partial Differential Equations

**Logic and Theory of Computing**

CS 682 Theory of Computing

CS 716 Seminar in Programming Refinement Logics
Math 581 Logic
Math 681–682 Seminar in Logic
Math 683 Model Theory
Math 684 Recursion Theory
Math 685 Metamathematics
Math 687 Set Theory
Math 688 Topics in Applied Logic

**Discrete and Numerical Mathematics**

CS 621 Matrix Computations
CS 622 Numerical Optimization and Nonlinear Algebraic Equations
CS 652 Sparse Matrix Theory: Combinatorial Algorithms and Numerical Computation
CS 681 Analysis of Algorithms
CS 721–722 Advanced Topics in Numerical Analysis
CS 729 Seminar in Numerical Analysis
Math 425 Numerical Solution of Differential Equations
Math 627–628 Seminar in Partial Differential Equations
Math 655 (also CS 655) Mathematical Foundations for Computer Science: Simulation

**OR & IE 625 Scheduling Theory**

**OR & IE 630–631 Mathematical Programming I and II**

**OR & IE 632 Nonlinear Programming**

**OR & IE 633 Graph Theory and Network Flows**

**OR & IE 634 Combinatorial Optimization**

**OR & IE 636 Integer Programming**

**OR & IE 637 Dynamic Programming**

**OR & IE 639 Convex Analysis**

**Information Communication and Control Theory**

EE 467 Communication Theory
EE 521 Linear System Theory
EE 522 Nonlinear System Theory
EE 561 Algebraic Coding Theory
EE 562 Information Theory
EE 568 Digital Communication
EE 573 Estimation and Control in Discrete Linear Systems
EE 574 Optimal Control and Estimation for Continuous Systems

**Mathematical Biology**

Bio S 662 Mathematical Ecology

**Mathematical Economics**

Econ 519 Econometrics I
Econ 520 Econometrics II
Econ 610 Stochastic Economics: Concepts and Techniques

**Econ 617–618 Mathematical Economics**

**Econ 619–620 Advanced Topics in Econometrics**

**Mechanics and Dynamics**

Chem E 751 Mathematical Methods of Chemical Engineering Analysis
Chem E 753 Analysis of Nonlinear Chemical Engineering Systems: Stability, Bifurcation, and Continuation
EE 681 (also A&EP 761). Kinetic Theory
M&AE 601 Foundations of Fluid Dynamics and Aerodynamics
M&AE 602 Incompressible Aerodynamics
M&AE 603 Compressible Aerodynamics
M&AE 704 Viscous Flows
M&AE 732 Analysis of Turbulent Flows
M&AE 733 Stability of Fluid Flow
M&AE 734 Turbulence and Turbulent Flow
M&AE 736 Computational Aerodynamics
M&AE 737 Computational Heat Transfer
T&AM 570 Intermediate Dynamics
T&AM 651 Continuum Mechanics and Thermodynamics
T&AM 671 Advanced Dynamics
T&AM 672 Celestial Mechanics
T&AM 673 Mechanics of the Solar System
T&AM 675 Nonlinear Vibrations
T&AM 765 Nonlinear Elasticity
T&AM 776 Qualitative Theory of Dynamical Systems

**Probability and Statistics**

EE 562 Information Theory
EE 563 Communication Networks
EE 564 Decision Making and Estimation
EE 565 Queuing Networks
EE 664 Foundations of Inference and Decision Making
Math 571–572 Probability Theory
Math 573 Design and Multivariate Analysis
Math 574 Probability and Statistics
Math 575 Sequential Analysis
Math 577 Nonparametric Statistics
Math 670 Topics in Statistics
Math 674 Multivariate Analysis
Math 675 Decision Theory
Math 677–678 Stochastic Processes
OR & IE 660 Applied Probability
OR & IE 661 Applied Stochastic Processes
OR & IE 670 Applied Statistics
OR & IE 671 Intermediate Applied Statistics
OR & IE 674 Design of Experiments
OR & IE 675 Qualitative Data Analysis
OR & IE 676 Statistical Analysis of Life Data

**Theoretical/Mathematical Physics/Chemistry**

Chem 792 Molecular Collision Theory
Phys 553–554 (Astro 550) General Relativity
Phys 572 Quantum Mechanics I
Phys 574 Quantum Mechanics II

Phys 561 Classical Electrodynamics
Phys 562 (Chem 795) Statistical Mechanics
Phys 563 Statistical Physics
Phys 651 Advanced Quantum Mechanics
Phys 652 Quantum Field Theory

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**Program on Science, Technology, and Society**

Dr. Walter R. Lynn, director, 632A Clark Hall, 255-3810

The Program on Science, Technology, and Society (STS) is an academic unit that engages in teaching and research involving the interactions of science and technology with social and political institutions. In collaboration with other university departments and centers, the STS program participates in the development of interdisciplinary courses at both the graduate and undergraduate level. These courses are designed to synthesize the perspectives of several academic disciplines in the analysis of relationships between science and technology on one hand and
today's society on the other. Current course and research topics include science, technology, and public policy; biology and society; science and law; arms control and national defense policies; energy policy; environmental policy and ethics; health and safety regulation; biomedical ethics; science policy; science and technology for development; scientific and technological literacy; and citizen participation in technical decision making. The program draws its students, faculty, and research staff from the various divisions of the university.

Graduate Studies
STS does not enroll students for advanced degrees. Rather, the program cooperates with departments in the various colleges to facilitate curriculum development and research interests in the interrelations of science, technology, and social policy. Faculty members affiliated with the STS program are also members of graduate fields of study such as city and regional planning, ecology, the various engineering fields, government, philosophy, sociology, and toxicology. It is possible to undertake research and course work in the area of science, technology, and society in one of the aforementioned fields, as well as in others. A minor concentration in science and technology policy is available in the graduate minor field of public policy and in the Master of Professional Studies (International Development) degree. Further information about these graduate programs may be obtained by contacting the Graduate School.

STS Courses
STS courses are cosponsored by the university academic departments. The titles and numbers of these courses are listed below; for course content and other details, refer to the listings of the particular cosponsoring department. Further information concerning the program, including a list of STS-related courses offered throughout the university and information concerning individualized courses of study, may be obtained from the program office, 632 Clark Hall (telephone: 255-3810).

Biological and Society Major
Developed initially by STS, the undergraduate curriculum in biology and society is a major in the College of Arts and Sciences and in the College of Human Ecology. It is also offered as an optional curriculum for undergraduates entering the General Studies Program of the New York State College of Agriculture and Life Sciences. Information and application materials may be obtained from the Biology and Society Office, 275 Clark Hall (255-6042).

Biological and Society Courses
Freshman Writing Seminars
Writing as a Naturalist (Biology and Society 113 and English 113)
Ecosystems and Ego Systems (Biology and Society 104)
Living on the Land (Biology and Society 108)
Women and Nature (Biology and Society 109 and English 106.5)

Foundation Courses
Ethics in Medicine (Biology and Society 205, Biological Sciences 205, and Philosophy 245)
Environmental Ethics (Biology and Society 206, Biological Sciences 206, and Philosophy 246)
History of Biology (Biology and Society 258, History 288, and Biological Sciences 202)

Core Courses
Biology and Society I: The Biocultural Perspective (Biology and Society 301, Biological Sciences 301, and Anthropology 301)
Biology and Society: Institutions, Roles, and Accountability (Biology and Society 306 and Human Services Studies 306)

Issues
Recombinant DNA Technology and its Applications (Biology and Society 232 and Biological Sciences 232)
The Anthropology of Medicine (Biology and Society 312 and Anthropology 312)
Health and Disease (Biology and Society 327, German Literature 327, and Psychology 387)
Medical Metaphors and Their Cultural Function (Biology and Society 328 and German Literature 328)
Human Growth and Development: Biological and Social Psychological Considerations (Biology and Society 347, Human Development and Family Studies 347, and Nutritional Sciences 347)
Culture and Human Disease (Biology and Society 386 and Anthropology 386)
Food, Agriculture, and Society (Biology and Society 469, Agriculture and Life Sciences 469, and Biological Sciences 469)
Medicine and the Law (Biology and Society 426)
Undergraduate Seminar in Biology and Society (Biology and Society 400)

Senior Seminars
Human Fertility in Developing Nations (Biology and Society 404 and Sociology 404)
Issues in Biotechnology, Society, and Law (Biology and Society 406 and Biological Sciences 406)
Law, Science, and Public Values (Biology and Society 407 and Government 407)
Agriculture, Society, and Biotechnology (Biology and Society 408 and Rural Sociology 405)
The Human and Ecological Consequences of Nuclear War (Biology and Society 411 and Peace Studies 420)
Population Policies (Biology and Society 414 and Sociology 414)
The Politics of Technical Decisions I (Biology and Society 415, Sociology 515, City and Regional Planning 541, Management NBA 666, and Government 628)
Medical Service Issues in Health Administration (Biology and Society 428, Biological Sciences 628, and Human Service Studies 628)
Social and Political Studies of Science (Biology and Society 442, Sociology 355, and City and Regional Planning 442)
Risk Management of Toxic Chemicals (Biology and Society 459 and Toxicology 659)
Environmental Biology Policy (Biology and Society 461, Agriculture and Life Sciences 661, and Biological Sciences 661)
Human Development in Postindustrialized Societies (Biology and Society 485 and Human Development and Family Studies 485)

Other Biology and Society Courses
Biology and Society: Preparation for Research (Biology and Society 300)
Independent Study (Biology and Society 375)
Honors Project (Biology and Society 499)

Other Courses by STS Faculty
The Politics of Technical Decisions II (Sociology 516, City and Regional Planning 542, Government 629, and Management NBA 687)
Regulation of Toxic Substances (Civil and Environmental Engineering 527 and Toxicology 627)
Ecology, Environment, and Society (Biology and Society 626)
Professional Practice (Civil and Environmental Engineering 503)

Program in Comparative and Environmental Toxicology
J. W. Gillett, director, 102B Fernow Hall, 255-8008 or 255-2193

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

Graduate Studies
The major in the graduate Field of Environmental Toxicology promotes training leading to the M.S. or Ph.D. degrees and provides both breadth and depth in environmental toxicology and related disciplines. The program offers a combination of research and didactic training that is designed to prepare students for solving the problems of modern toxicology. Specializations include biochemical, genetic, nutritional, and veterinary toxicology; ecotoxicology; and policy issues associated with the use, risk management, and regulation of toxic substances. Research of the faculty associated with the program is focused on the interactions of drugs, pesticides, and other potentially hazardous environmental agents with a wide variety of living organisms (including humans) and with the ecosystems with which these organisms are associated.

Courses
Courses in environmental toxicology are cosponsored by the university academic departments and are open to all graduate students and to those undergraduates who have permission of the instructor. The titles and numbers of these courses are listed below, and details of course content are provided elsewhere in the catalog under the listings of the cosponsoring department. Further information concerning the program and the development of new courses may be obtained through the graduate field representative, 275 Clark Hall (telephone: 255-6047).

Tox 370 Pesticides and the Environment (Entomology 370)
Tox 419 Animal Cyto genetics (Animal Science 419)
Tox 438 Cell Proliferation and Oncogenic Viruses (Biological Sciences 438)
Tox 529 Pharmacology (Veterinary Medicine 529)
Tox 607 Ecotoxicology (Natural Resources 607)
Tox 609 Effects of Ecological Perturbations on Fishes (Natural Resources 609)
Tox 610 Introductory Chemical and Environmental Toxicology (Food Science 610)
Tox 611 Molecular Toxicology (Nutritional Sciences 611)
Tox 621 Clinical Veterinary Toxicology (Veterinary Medicine 621)
Tox 623 Environmental Law I (Civil and Environmental Engineering 525)
Tox 627 Regulation of Toxic Substances (Civil and Environmental Engineering 527)
Tox 640 Principles of Toxicological Pathology (Veterinary Medicine 640)
Tox 651 Nutrition and the Chemical Environment (Nutritional Sciences 651)
Tox 659 Risk Management of Toxic Chemicals (Biological Sciences 659 and Biology and Society 459)
Tox 660 Safety Evaluation in Public Health (Veterinary Medicine 660)
Tox 690 Insect Toxicology and Insecticidal Chemistry (Entomology 690)
Tox 698 Current Topics in Environmental Toxicology (Nutritional Sciences 700)
Tox 700 Ecotoxicological Methods (Natural Resources 700)
Tox 702 Seminar in Toxicology (Nutritional Sciences 702)
Visual Studies

Robert Ascher, Department of Anthropology and Marilyn Rotherin, Department of Theatre Arts, advisers

Visual Studies as a distinct area of intellectual activity comprehends the analysis of visual forms, especially symbolic visual forms, from a range of historical, scientific, sociological, and aesthetic points of view. Images can be analyzed within a variety of contexts and by means of a variety of methods, and their study is therefore ideally conceived of in transdisciplinary terms. And since the creation of images has an important bearing on their analysis, visual studies concerns itself with practice as well as theory.

In addition to the courses listed below, which represent only a sampling of formal curricular offerings pertinent to visual studies, interested students should be aware of the programs and facilities available in the Herbert F. Johnson Museum of Art and the ETV Center of the College of Human Ecology, as well as the frequent showings sponsored by Cornell Cinema and Pentangle.

Courses

Some of these courses may not be taught in 1987-88. For information about availability consult the appropriate departmental listings. 

- **Art 161-162 and Architecture Environments** (Civil and Environmental Engineering 103)
- **Communication 348**
- **Design I and II** (Design and Environmental Analysis 101 – 102)
- **Documenting the Depression: Film, Literature, and Memory** (History 476)
- **Ethnographic Film** (Anthropology 205)
- **Film and Performance** (Theatre Arts 311)
- **Freshman Seminar in Visual Analysis** (History of Art 103)
- **Fundamentals of 16-mm Filmmaking** (Theatre Arts 377)
- **German Film** (Comparative Literature 396)
- **Historic Design** (Design and Environmental Analysis 251)
- **History and Theory of Commercial Narrative Film** (Theatre Arts 311)
- **The History of the Book** (English 450)
- **How to Look at Works of Art** (History of Art 104)
- **Image Analysis I** (Landform) and II (Physical Environments) (Civil and Environmental Engineering 613 – 614)

**Impact of Communication Technologies** (Communication 626 [643])

- **Introduction to Film Analysis: Meaning and Value** (Theatre Arts 374)
- **Introduction to Mass Media** (Communication 120)
- **Introductory Photo** (Art 161 – 162 and Architecture 251)
- **The Japanese Film** (Asian Studies 313)
- **The Medieval Illuminated Book** (History of Art 337)
- **Modern Experimental Optics** (Physics 330)
- **Myth onto Film** (Anthropology 653 and Theatre Arts 653)
- **Perspective** (Psychology 205)
- **Photo Communication** (Communication 234)
- **Psychology of Visual Communication** (Psychology 347)
- **Seminar in Museum Issues** (History of Art 407)
- **Seminar on Ethnographic Film** (Anthropology 430)
- **Shakespeare on Film** (English 427)
- **The Spanish Civil War in Literature and Visual Art** (Comparative Literature 329)
- **Spanish Film** (Spanish 399)
- **Theory of Design** (Design and Environmental Analysis 111)
- **Understanding the Language of Television Images** (Linguistics 205)
- **Video Communication** (Communication 348)
- **Vision** (Genetics and Development 395)
- **Visual Anthropology** (Anthropology 453)
- **Visual Communication** (Communication 230)
- **Visual Ideology** (German 660 and Theatre Arts 660)
- **Visual Percpetivity** (Anthropology 205)
- **Writing about Film** (Theatre Arts 108 and English 108)

**John S. Knight Writing Program**

The John S. Knight Writing Program helps to coordinate the teaching of writing for undergraduates in six of the university's schools and colleges (the School of Industrial and Labor Relations and the Colleges of Agriculture and Life Sciences; Architecture, Art, and Planning; Arts and Sciences; Engineering; and Human Ecology). The program administers interdisciplinary writing seminars for freshmen and upperclass students, tutorial writing classes, and seminars in the teaching of writing. More than twenty-five academic departments participate in the program.

**Advanced Writing Seminars**

For upperclass students the program offers two upper-division writing courses, Writing in the Humanities and Writing in the Social Sciences. These courses help students write with more confidence and skill in all disciplines while provoking inquiry about the methods and aims of study common to many of them. They may be taken as electives or to fulfill distribution or certain writing requirements.

**Freshman Writing Seminars**

For freshmen the program offers the freshman writing seminars—more than 125 different courses in the humanities, social sciences, expressives arts, or sciences. Freshman writing seminars help students write good English prose—prose that, at its best, is characterized by clarity, coherence, intellectual force, and stylistic control. These seminars teach writing within a field while offering freshmen the opportunity to participate in a small seminar. Although they differ widely in content, all seminars adhere to the following guidelines:

1. at least thirty pages of assigned writing
2. at least eight— and, at most, about fourteen— writing assignments
3. opportunities for serious revision, not mere editing, of essays (at least some of these revising assignments may satisfy 1 and 2 above)
4. ample classroom time spent on work directly related to writing
5. reading assignments small enough— about one hundred pages a week at most—to permit regular, concentrated work on writing
6. individual conferences

Offerings change from semester to semester. Each term's freshman writing seminars are described in a brochure available from college registrars.

To ensure that students may enjoy the benefits of small writing classes, no freshman writing seminar may comprise more than seventeen students. Instead of pre-enrolling in their writing courses, students request placement in one of five writing seminars by filling out ballots available from their college registrars. Most students receive one of their highest choices. Students may change their writing seminar at the university course exchange or during the add/drop sessions held at the beginning of each semester.

The colleges and the school served by the program accept freshman writing seminars in fulfillment of their individual graduation requirements, in categories referred to variously as "freshman writing," "oral and written expression," and the like. The program does not decide whether students may graduate: it makes courses available. Individual colleges and schools administer their own graduation requirements.

Currently most undergraduate students are required to take two freshman writing seminars. Architecture, art, and planning students, however, need only one. Hotel students fulfill their requirement through Hotel Administration 165, which should be taken with Hotel Administration 265 during the first two semesters at Cornell. Agriculture and life sciences students can take freshman writing seminars or choose from among a variety of other courses to fulfill their requirement.

Although there are no exemptions to college writing requirements, some students may fulfill part of their college's writing requirement through transfer credits, writing course substitutions, or an advanced placement test administered by the Department of English. For work done at other institutions to be accepted as equivalent to freshman writing seminars, students should demonstrate that they have done a reasonably equivalent amount of writing in a formal course. (It is not sufficient to write, for example, one thirty-page term paper.) Students in the College of Engineering and the College of Arts and Sciences must file an "application for transfer evaluation" to request writing credit for such courses, whereas students in other colleges should consult their college registrars.

In unusual situations the program recommends that courses taken at Cornell other than freshman writing seminars fulfill the various freshman writing requirements. Upper-division students may also take a writing course other than a freshman writing seminar and petition to have it satisfy part of the requirement. The program advises students about these courses on request. Students must file the "proposal for course substitution" to request writing credit for such courses.

Although Cornell "summer freshman writing seminars" may fulfill college writing requirements, students do not automatically count toward those requirements. Students who have taken these courses must ask their college registrars to assign the credits in the appropriate categories.

**Teaching Writing**

Each summer and fall, the program offers instruction in the teaching of writing to new staff members of the freshman writing seminar program and other interested instructors. Teaching Writing in conjunction with an apprenticeship in the summer school is primarily a course for graduate students; the same course is offered alone in the fall as Teaching Writing II. The program also sponsors a summer institute for faculty members interested in the teaching of writing.

The director of the John S. Knight Writing Program is Harry E. Shaw, associate professor of English; the associate director is Katherine K. Gottschalk, senior lecturer in English. The office manager is Mark E. Hambiet. The program's offices are in S5 Goldwin Smith Hall (telephone: 255-4061).

**Writing Workshop**

The John S. Knight Writing Program offers Workshops in English Composition for freshmen (or transfer students needing writing credit) through the Writing Workshop. These tutorials are designed primarily for students who have had little training in composition or who have serious difficulty with writing assignments. Writing 157 and 158 are graded S-U only, and all students receiving a grade of S are granted credit toward their college writing requirements. Students who think this course might be appropriate, including non-native speakers of English scoring less than 600 on the test of English as a Foreign Language (TOEFL), should attend the assessment sessions offered by the Writing Workshop during orientation week each fall. The workshop also offers a walk-in service (see "Special Academic Services and Programs") to help students with problems in essay writing. The director is Nancy Kaplan, senior lecturer in English; the workshop offices are in 17A Rockefeller Hall (telephone: 255-6349).
Advanced Placement of Freshmen

The final decision on awarding advanced placement credit at Cornell rests with each individual college. The appropriate department of instruction within the university sets the standards of achievement that must be met for advanced placement and recommends AP credit for those who meet the standards. This recommendation is based on a student's participation in an AP course and the results of an AP examination. Policies governing advanced placement vary from college to college, so it is advisable that students should consult the academic information section of that college. Students do not accept advanced placement. They may repeat the examination and improve their score. For policies governing advanced placement in a specific college, see the academic information section of that college. Students need not accept advanced placement. They may repeat the course, thereby relinquishing the advanced placement credit.

The Advanced Placement (AP) Program of the College Entrance Examination Board (CEEB) is the best known and most generally used of the programs that provide advanced placement credits for those who meet the standards. This program is sponsored by the Advanced Placement Program of the College Entrance Examination Board (CEEB). It provides a schedule of these examinations during the summer, and students need not accept advanced placement. They may repeat the course, thereby relinquishing the advanced placement credit.

Departmental advanced standing examinations. Students may also qualify for advanced standing credit based on departmental examinations given in the student's college or school during orientation week. A schedule of these examinations will appear in the orientation booklet that will be mailed to entering students in late summer. The departments that award advanced placement credit and credit on the basis of CEEB Advanced Placement Examinations or departmental examinations are shown below.

Departmental advanced standing examinations. In certain subjects, students may also qualify for advanced standing credit by taking examinations that are determined by the departmental examination given in the student's college or school during orientation week. A schedule of these examinations will appear in the orientation booklet that will be mailed to entering students in late summer. The departments that award advanced placement credit in the arts and sciences are shown below.

Departmental advanced standing examinations. In certain subjects, students may also qualify for advanced standing credit by taking departmental examinations. These examinations will be given in the student's college or school during orientation week. A schedule of these examinations will appear in the orientation booklet that will be mailed to entering students in late summer. The departments that award advanced placement credit in the arts and sciences are shown below.

Transfer of credit. Entering freshmen who have completed college courses for which they want to receive credit toward their Cornell degree should send transcripts and course descriptions to their college or school office (see the list at the end of this section). Placement and credit on the basis of these examinations will usually be determined during the summer, and students will be notified before course scheduling.

Departmental advanced standing examinations. In certain subjects, students may also qualify for advanced standing credit by taking departmental examinations. These examinations will be given in the student's college or school during orientation week. A schedule of these examinations will appear in the orientation booklet that will be mailed to entering students in late summer. The departments that award advanced placement credit in the arts and sciences are shown below.

Foreign credentials. Information regarding Cornell's advanced standing policy for foreign credentials may be obtained by contacting the Associate Director of International Admissions, Cornell University, 517 Thurston Avenue, Ithaca, New York 14850-2488, U.S.A. Students holding foreign credentials who feel they may be eligible for advanced standing consideration should contact the International Student Office before enrollment for clarification of the advanced standing policy.

Written inquiries. Many department, school, and college offices encourage students to contact them with any questions they may have. Addresses given in the following sections may be completed by adding Ithaca, New York 14853.

Forwarding of scores and transcripts. Entering freshmen should have their advanced placement test scores sent to their school or college office. FRONTIER STATION, 150 Roberts Hall.

Advanced Placement of Freshmen

The Division of Biological Sciences grants advanced placement credits and exemption from introductory biology courses based on superior performance on the CEEB Advanced Placement Examination in biology. The Department of Chemistry offers two sequences that provide advanced standing credits in chemistry by satisfactory performance on the CEEB Advanced Placement Examination in chemistry. 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. Students receiving advanced placement who are interested in a major in chemistry or a related science should sign up for Chemistry 215-216 and should consult the Chemistry 215 instructor.

Classics

For advanced placement and credit in Latin and Greek, students should consult the Department of Classics, Cornell University, 121 Goldwin Smith Hall. Advanced placement and credit are determined as outlined below.

Latin. The department determines credit and placement based on a departmental examination. A student who is permitted to register in a 300-level course will be given six advanced placement credits.

Greek. The department determines credit and placement based on a departmental examination.

Economics

Students with a strong background in introductory economics may, with the consent of the instructor, register for intermediate courses without taking Economics 101–102.

English

For exceptionally well qualified freshmen the Department of English will recommend three or six advanced placement credits, and freshmen for whom such credit has been recommended will also be eligible to enroll in English 270, 271, or 272. The department will consider awarding advanced placement credit to freshmen who receive scores of 750 or above on the CEEB College Placement Test (CPT; formerly CEEB Achievement Test) in English composition, 710 or above on the CEEB College Placement Test in literature, or 5 on the CEEB Advanced Placement Examination. Students who seek advanced placement credit are encouraged to take as many of these tests as possible.

Students who receive scores of 700 to 749 on the CEEB College Placement Test in English composition, 700 to 709 on the CEEB College Placement Test in literature, or 4 on the CEEB Advanced Placement Examination will be eligible to take an advanced standing examination offered by the department during orientation week. These students, too, are eligible to take English 270, 271, or 272. This examination will be an important factor in awarding advanced placement credit.

Advanced placement credit awarded in English may not be used to satisfy the humanities or expressive arts requirement of the College of Arts and Sciences.

If space permits, freshmen whose secondary school records indicate they are qualified may enroll in English 270, 271, or 272 during their first semester.

German Literature

The Department of German Literature will grant three credits to students with a score of 4 or 5 on the Advanced Placement Examination. For information about the College Placement Test, see "Modern Languages," below.
History

The Department of History will grant four credits to students who score 4 or 5 on the CEEB Advanced Placement Examination in European history and four credits to those with such scores in the American history examination. Such credits are granted automatically, without application to the department. These credits may not be used to fulfill requirements of the history major or distribution requirements of the College of Arts and Sciences.

History of Art

The Department of History of Art will grant three credits to students who score 4 or 5 on the CEEB Advanced Placement Examination. Such credits are granted automatically, without application to the department. Those credits may not be used to fulfill requirements of the history major or distribution requirements of the College of Arts and Sciences.

Mathematics

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

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

The following rules do not apply to students being admitted to the College of Engineering. See the college's brochure for a detailed statement.

Students with a grade of 4 or 5 on the BC examination may take the appropriate third-semester course (Mathematics 293, 212, or 213), but students entering Mathematics 293 may have to make up some material on partial differentiation. Students with a 3 on the BC examination or a 4 or 5 on the AB examination may take the appropriate second-semester course (Mathematics 192, 192E, or 112). Students with a 2 on the BC examination or a 3 on the AB examination may take one of the second-semester courses (Mathematics 192 or 112). Advanced placement credit will be awarded appropriately; however no credit will be granted for a grade of 1 on the BC or 1 or 2 on the AB examination. A grade of 3 or higher on the BC examination satisfies the distribution requirement in mathematics for students in the College of Arts and Sciences.

Note, however, that the grade of 3 is not sufficient for a full year of advanced placement credit in mathematics. The placement examination in mathematics is offered at Cornell only during orientation week and should be taken by students who

1) have had at least a semester of calculus but did not take a CEEB Advanced Placement Examination;
2) have received a 2 on the BC examination or a 3 on the AB examination and want to enter the upper sequence;
3) believe that the placement assigned on the strength of the CEEB Advanced Placement Examination is not high enough in their case.

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

Modern Languages

Language placement tests. 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 College Placement Test (CPT). Language course placement is made using guidelines that match CPT reading scores with various levels of courses. In cases where no CPT exists for a particular language, the Department of Modern Languages and Linguistics designates a professor to handle placement for that language. Students who have had a year of formal study or substantial informal study since they last took a CPT may take the examination again during orientation week if they plan to continue course work.

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

1) For high school work, three to six credits may be granted for the equivalent of 200-level courses. Credit is based on performance on the CEEB Advanced Placement Examination, Cornell's Advanced Standing Examination (CSEP), or a special departmental examination. To be eligible for Cornell's Advanced Standing Examination, students must have earned a score of 650 or above on the reading section of the College Placement Test (CPT). A student who has received three credits by scoring 4 or 5 on the CEEB Advanced Placement Examination is advised to take the Cornell Advanced Placement Examination. Outstanding performance on this examination could provide three additional credits.

2) For formal language work at an accredited college, credit is considered by the department on submission of a transcript and may be entered on the student's Cornell record.

3) Native speakers of languages other than English may, on examination by the appropriate professor, be granted a maximum of six credits if they can demonstrate proficiency equivalent to course work on the 200 level or above at Cornell. Additional credit will be considered only for those who pursue advanced work in their native language.

Information about times and places to take placement tests is available in the orientation booklet from Academic and Career Counseling Services, 203 Morrill Hall, and in the Cornell University placement test guide. The results of a College Placement Test (CPT) are available in the orientation booklet, from Academic and Career Counseling Services, and from the Department of Modern Languages and Linguistics. Students who scored 4 or 5 on the CEEB College-Level Examination Program psychology test may receive three advanced placement credits in psychology.

Physics

Advanced placement and credit are awarded on the basis of the CEEB Advanced Placement Examination in physics (physics B or physics C), certain international examinations, or the departmental examination (which may be taken during orientation week or at other times as arranged). For information about the departmental examination, students should consult Professor R. Cotts, 522 Clark Hall.

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

Physics C.

1) C—Mechanics. Students earning a score of 4 or 5 may receive four credits for Physics 112 or 207.
2) C—Electricity and Magnetism. Students earning a score of 4 or 5 will be eligible for four credits for Physics 208 or 213, or for placement into Physics 217 with no AP credit. Students earning a score of 4 will be eligible for four credits for Physics 208 or placement into Physics 217 with no AP credit. Students with scores of 4 or 5 and who have questions may first meet with the department representative, Professor R. Cotts, 522 Clark Hall, or from the Department of Physics, Cornell University, 109 Clark Hall.

Psychology

Students who scored 4 or 5 on the CEEB College-Level Examination Program psychology test may receive three advanced placement credits in psychology. Those interested in taking further courses in psychology should consult a faculty member in the Department of Psychology, Cornell University, 232 Uris Hall.

Advanced placement based on the CEEB test may not be used to satisfy the distribution requirement in the College of Arts and Sciences. Credit toward the requirements of a major in psychology will depend on the recommendation of the student's major adviser.

Romance Studies (French and Spanish Literature)

The Department of Romance Studies grants three credits to students with a score of 4 or 5 on the Advanced Placement Examination in French or Spanish literature or in French or Spanish language.

For information about the College Placement Test, see "Modern Languages," above.

Near Eastern Studies

For advanced placement and credit in Hebrew and Arabic, students should consult the Department of Near Eastern Studies, Cornell University, 360 Rockefeller Hall. Advanced placement and credit are determined by departmental examination.
### Advanced Placement Program (CEEB) Examinations

#### Summary of Credit and Placement

<table>
<thead>
<tr>
<th>Subject</th>
<th>Score</th>
<th>Advanced Placement Credit</th>
<th>Placement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arabic</td>
<td></td>
<td></td>
<td>Department determines credit and placement based on departmental examination.</td>
</tr>
<tr>
<td>Biology‡</td>
<td></td>
<td></td>
<td>Placement out of all introductory courses.</td>
</tr>
<tr>
<td>Biology*</td>
<td></td>
<td></td>
<td>Consult department to determine which semester to take to complete introductory biology.</td>
</tr>
<tr>
<td>Chemistry‡</td>
<td></td>
<td></td>
<td>Department determines placement.</td>
</tr>
<tr>
<td>Computer science</td>
<td></td>
<td></td>
<td>Department determines credit and placement based on CEEB Achievement Examination.</td>
</tr>
<tr>
<td>Economics</td>
<td></td>
<td></td>
<td>Department determines credit and placement.</td>
</tr>
<tr>
<td>English</td>
<td></td>
<td></td>
<td>Department uses additional measures. Qualified students are notified.</td>
</tr>
<tr>
<td>French language</td>
<td></td>
<td></td>
<td>Department determines placement.</td>
</tr>
<tr>
<td>French literature</td>
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<td></td>
<td>Department determines placement.</td>
</tr>
<tr>
<td>German language</td>
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<td></td>
<td>Department of Modern Languages and Linguistics determines placement.</td>
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<tr>
<td>German literature</td>
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<td></td>
<td>Department determines placement.</td>
</tr>
<tr>
<td>Greek</td>
<td></td>
<td></td>
<td>Department determines credit and placement based on departmental examination.</td>
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<tr>
<td>Hebrew</td>
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<td></td>
<td>Department determines credit and placement based on departmental examination.</td>
</tr>
<tr>
<td>American history</td>
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<td></td>
<td>Department determines credit and placement.</td>
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<tr>
<td>European history</td>
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<td></td>
<td>Department determines credit and placement.</td>
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<tr>
<td>History of art</td>
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<td></td>
<td>Department determines credit and placement.</td>
</tr>
<tr>
<td>Italian literature</td>
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<td></td>
<td>Department of Romance Studies determines placement.</td>
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<tr>
<td>Latin</td>
<td></td>
<td></td>
<td>Department of Modern Languages and Linguistics determines placement.</td>
</tr>
<tr>
<td>Mathematics BC</td>
<td></td>
<td></td>
<td>Department determines credit and placement based on departmental examination.</td>
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<tr>
<td>(excluding engineering students; see p. 263)</td>
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<td></td>
<td>Placement out of 111, 112. Permission to take 221, 293, or 213.</td>
</tr>
<tr>
<td>Mathematics AB</td>
<td></td>
<td></td>
<td>Placement out of 111, 112. Permission to take 112, 122, or 192.</td>
</tr>
<tr>
<td>(excluding engineering students; see p. 263)</td>
<td></td>
<td></td>
<td>Placement out of 111, 112, 122, or 192.</td>
</tr>
<tr>
<td>Music</td>
<td></td>
<td></td>
<td>Placement out of 111, 112. Permission to take 112 or 192.</td>
</tr>
<tr>
<td>Physics B‡</td>
<td></td>
<td></td>
<td>Placement out of 111, 112, 122, or 192.</td>
</tr>
<tr>
<td>Physics B, and Mathematics BC‡</td>
<td></td>
<td></td>
<td>Placement out of 111, 112, 122, or 192.</td>
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<tr>
<td>or Mathematics AB‡</td>
<td></td>
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<td>Placement out of 111, 112, 122, or 192.</td>
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<tr>
<td>Physics C—Mechanics‡</td>
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<td>Placement out of 111, 112, 122, or 192.</td>
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<tr>
<td>Physics C—Electricity and Magnetism‡</td>
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<td>Placement out of 111, 112, 122, or 192.</td>
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<tr>
<td>Psychology</td>
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<td>Department determines credit and placement.</td>
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<tr>
<td>Sociology</td>
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<td>Department determines credit and placement.</td>
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<tr>
<td>Spanish language</td>
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<td>Department determines credit and placement.</td>
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<tr>
<td>Spanish literature</td>
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<td></td>
<td>Department determines credit and placement.</td>
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</tbody>
</table>

*Biological sciences majors and other students who expect to take advanced biology courses. These students will receive a total of 8 introductory biology credits (4 advanced placement credits and 4 course credits).
†Cornell Advanced Standing Examination. Contact the Department of Modern Languages and Linguistics, 203 Morrill Hall.
‡In the College of Arts and Sciences, AP credit may be used to satisfy one-half the distribution requirement in science. See p. 97.
Special Academic Services and Programs

The Learning Skills Center

The Learning Skills Center (LSC) is a central academic support service at Cornell University. Its purpose is to assist students in the development of learning strategies, skills, and insights that lead to academic success. The Learning Skills Center serves any student who needs its program but places particular emphasis on special programs students, including students in HEOP, EOPE, COSEP or the Division of Unclassified Students. The LSC provides supplemental instruction in core courses (biology, chemistry, mathematics, physics) and tutorial and study sessions. A prefreshman summer program is available to COSEP students, which provides an opportunity to develop academic skills before fall enrollment. The LSC has study-hall accommodations and provides students access to microcomputers, a reserve library, an examination file, audio study-tapes, and xeroxing.

Reading and Study Skills Program. This program offers courses in speed reading and a variety of study skills. Special emphasis is placed on how to read texts, budget time, and prepare for examinations. A credit course is offered in reading and learning strategies through the College of Human Ecology. In addition, audio cassettes on these topics are maintained at the LSC, the Media Room of Uris Library, the reserve desk of Mann Library, and the three student unions. The Reading and Study Skills Program is located in the Learning Skills Center, 375 Olin Hall.

The Macintosh Center

Undergraduates should consider the widespread availability of Macintoshs on campus to be a unique tool for writing and revising their essays. The Macintosh Center, housing twenty microcomputers, is a facility supported by the John S. Knight Writing Program for students in writing courses. The center offers introductory classes on the Macintosh and works closely with many writing instructors to help students learn how to use word processing as an effective writing tool. The center is in 340 Goldwin Smith Hall (telephone: 255-8453).

Walk-In Service

At any time during the academic year, students who need help with writing problems may consult with tutors in the Walk-In Service, a unit of the Writing Workshop. Branches of the Walk-In Service may be found in 14 Rockefeller Hall and 340 Goldwin Smith Hall, and in the North and West Campus dormitories. For more information about the Walk-In Service, contact the Writing Workshop in 14 Rockefeller Hall (telephone: 255-6349).

Tutoring Services

The Interfraternity Council provides tutors without fee to any student who needs help with a course. Tutors are available in virtually every field. For more information, students should call 255-5183 or stop at the IFC office, 210 Willard Straight Hall.

Cornell Abroad

International study experience is recognized as a valuable educational opportunity for Cornell students. Cornell began administering study abroad programs in fall 1985 with program sites in Great Britain, Denmark, France, Spain, Germany, Switzerland, Israel, and Egypt. A program in Japan is expected to begin in 1988. Programs in Spain, Switzerland, France, and Germany require the equivalent to two years of college-level language study and have resident faculty directors. All programs integrate Cornell students as much as possible into local university life, including classes and living arrangements. Information on these programs, as well as programs sponsored by other educational institutions, and on direct enrollment in foreign institutions is available from the Career Center and the academic advising office in each college.

Agriculture and life sciences
Donald Burgett, 17 Roberts Hall
Architecture, art, and planning
Professor Christian Otto, 140 Sibley Dome
Arts and sciences
Assistant dean Beatrice Rosenberg, 55 Goldwin Smith Hall
Engineering
Associate dean Richard Lance, 219 Kimball Hall
Hotel administration
Professor William Kaven, 300 Statler Hall
Human ecology
Florence McCarthy, 170 Van Rensselaer Hall
Industrial and labor relations
Laura Lewis, 101 Ives Hall

Students should plan to include language study in their schedules during the first two years. Admission to many foreign study programs requires a strong academic record, generally a B average or above. Further information on study abroad may be obtained in the college advising offices, in the Cornell Abroad office, at the Career Center in Sage Hall, or from the director of undergraduate studies in each department.

Counseling and Academic Advising Services

The Career Center, an academic support service, and the college career offices work together to help students explore, discover, and choose a career. The Career Center provides assistance in six major areas: academic and career counseling, career information, health careers, job hunting, special programs for minorities, and professional and graduate schools. Professional advisers and counselors as well as student advisers are available. Career Center offices are located in Sage Hall and Barnes Hall and are open Monday through Friday from 8:00 a.m. to 4:30 p.m.

The Sage Hall office, at 14 East Avenue (telephone: 255-5221), houses an extensive career library with up-to-date resources on careers and career decision making, employment, graduate and professional schools, study-abroad programs, and health careers and a variety of audio- and videotapes for each area. It also offers seminars on applying to graduate and professional schools, assists students in job hunting through on-campus interviews with employers and the Cornell Connection, and provides special programs and advice for minority students.

The office in 203 Barnes Hall (telephone: 255-5044) provides academic and career counseling to individuals and groups, conducts academic and vocational testing, and administers language placement tests for students enrolling in foreign language courses. It maintains a credential service for letters of recommendation, transcripts, and other personal documents retained and distributed by request to employers and graduate and professional schools. It also provides special information resources and advice for students interested in careers or professional schools in the health fields.

Career center offices, located in each of the undergraduate colleges, provide services tailored to the curricula and career goals of each college's students. Services vary from office to office but generally include career libraries, job listings, summer job and internship programs, job-preparation workshops, on-campus recruiting, and individual counseling. Special services provided by the college offices include computer-assisted career guidance, career days, and alumni programs. Students may take advantage of services offered by both their college offices and those of the Career Center. Most college offices are open Monday through Friday from 8:00 a.m. to 5:00 p.m.
Services for the Disabled

As a university committed to the principle of equal opportunity, Cornell must make its academic and social resources available to all students, including persons with disabilities such as loss of sight, hearing impairments, neurological limitations, limited mobility, or learning disabilities. Cornell desires to provide access in as integrated and natural a setting as possible; the emphasis is on bringing the student to the class rather than on bringing the class to the student. A campus-wide program to provide ramps, curb cuts, and remodeled rest-room facilities has been completed. Special parking permits for the disabled can be obtained from the Traffic Bureau, and arrangements for accessible accommodations in residence hall facilities are available for individual students.

The campus coordinator for the disabled is located in the Office of Equal Opportunity, 234 Day Hall (telephone: 255-5298; voice/TTY). Those who have any questions are urged to contact the coordinator for assistance and, where appropriate, referral to the proper resource person. Anyone who will need special accommodations, either in his or her living situation or with classes, should contact the coordinator as soon as possible.

Each school within Cornell University has designated a representative to assist disabled students with such matters of academic concern as course scheduling, classroom and laboratory accommodations, special provisions for taking examinations, and examinations. Their names may be obtained from the Office of Equal Opportunity.

Minority and Special Opportunity Programs

Cornell University administers a variety of programs designed to provide academic and personal support to minority and low-income students who meet program guidelines.

In 1963 President James A. Perkins founded the Committee on Educational Projects (CCEP) in accordance with Cornell's mission as a land-grant institution and its founding philosophy: "I would found an institution where any person can find instruction in any study." Cornell seeks to recruit and admit minority students with outstanding credentials as well as those with strong concern for academic success but whose secondary school profiles are not as competitive because of disadvantaged educational and economic backgrounds. CCEP provides a comprehensive support program for minority students who have been admitted to one of Cornell's undergraduate schools or colleges.

The main goals of the program are to:

1) assist in the university's effort to increase the enrollment of minority students who have traditionally been underrepresented in higher education
2) provide supportive services after admission for academic, personal, and social adjustment
3) assist the schools and colleges in raising the retention and graduation rates for minority students
4) encourage institutional change to ensure an excellent education for minority students

State Programs (HEOP and EOP)

In 1969 CCEP was expanded by the addition of the New York State Educational Opportunity Program (Colleges of Agriculture and Life Sciences, and Human Ecology, and the School of Industrial and Labor Relations) and the Higher Educational Opportunity Program (Colleges of Architecture, Art, and Planning; Arts and Sciences; and Engineering, and the School of Hotel Administration). These programs are called EOP and HEOP respectively.

HEOP and EOP give students who would not be admitted through regular admission selection an opportunity to attend Cornell. The programs provide students with academic supportive services, counseling, and financial aid. Regardless of their ethnic background, New York State residents who are both academically and economically disadvantaged are eligible.

Student Services

Services include student activities, work-study jobs, leadership training, and assistance in development of organizational skills and implementation of programs. A general counseling-referral service is also provided by the office. COSEP has associate staff members in the Office of Financial Aid, the Career Center, and Gannett Psychological Service to assist students in these areas.

Office of Minority Educational Affairs

Over the years Cornell has made considerable strides in enriching the academic, cultural, and social experience of minority students through the Office of Minority Affairs. This office, which is the center of activity for minority students, ensures that a variety of support services are available to assist students in making a more positive academic and social transition to the university. The Office of Minority Affairs represents many things to many people. For some it serves as a forum for political, social, and educational expression. For others it is a home-away-from-home, a place where student organizations evolve, helping to enhance cultural awareness. There are over four hundred organized clubs on campus, and minority student clubs are among the most active. Listed below are many of the organizations of special interest to minority students.

Alpha Kappa Alpha
Alpha Phi Alpha
American Indian Science and Engineering Society
Asian American Coalition
La Asociación Latina
Black Bio-Medical Technical Association
Black Graduate Business Student Association
Black Graduate Student Association
Black Greek Council
Black Students Union
Chinese Cultural Society
Le Club Haitien
Cornell African Students Association (CASA)
Cornell Chinese Dance Company
Cornell Chinese Students Association
Cornell Korean Society
Cornell Prison Project
Delta Sigma Theta
Ethen Yearbook
Hong Kong Student Association
Human Ecology Minority Student Association
The Ithaca Ethiopian Drought Committee
Kappa Alpha Psi

Mexican American Student Association (MASA)
Minority Industrial and Labor Relations Student Organization (M.I.L.R.O.)
Minority Undergraduate Law Society
Minority Undergraduate Veterinary Association
National Society of Black Engineers, C.U. chapter (N.S.B.E./C.U.)
Northern New York Students at Cornell (N.A.I.S.C.)
Omega Psi Phi fraternity
Delta Mu chapter
Pan-African Gospel Choir
Phi Beta Sigma fraternity
Society of Hispanic Professional Engineers
The South African
Divestment Coalition
Sphinx Literary Society
State of Black America
Coordinating Committee
Third World Student Programming Board
La Unidad Latina/Lambda
Upsilon Lambda
West Indian Students Association
Zeta Phi Beta Sorority

International Students and Scholars Office

The International Students and Scholars Office, 200 Barnes Hall (telephone 607/255-5243), serves as an information center and provides arrival assistance, housing information, personal and academic advising and counseling, immigration advising, and financial planning assistance.

Financial Aid

Eligibility and Availability

Financial aid resources for undergraduate nonimmigrant foreign students are severely limited at Cornell. Consequently, the competition for these awards is keen, and only a small percentage of each entering class receives assistance. Students who receive financial aid are likely to be among those with exceptional academic records, high test scores, strong potential for positive contributions to the Cornell community and demonstrated financial need. Awards are a combination of scholarship, loan, and on-campus work.

Because of limited funding students not receiving aid from Cornell on matriculation will not be considered for aid in subsequent years. Financial plans should be made accordingly.

Nonimmigrant students who receive financial aid from the university must reapply for aid each year. Application forms are available from the International Student Office.

Loans and Employment

Short-term emergency loans are available through the International Students and Scholars Office for students who face unexpected financial crises.

Nonimmigrant foreign students are not eligible for the federal work-study program that is administered by the Student Employment Office. Foreign students holding F-1 visas may accept non-work-study employment on campus for up to twenty hours a week. Because of visa restrictions, foreign students may not accept any off-campus employment without permission of the United States Immigration and Naturalization Service. Questions regarding permission to work should be referred to the International Students and Scholars Office.

Note: Foreign students in the School of Hotel Administration who want to fulfill their practice credit requirement by working in the United States during summer vacation should contact the International Students and Scholars Office.

Health Requirement

Foreign students and their dependents must present a chest X-ray taken within twelve months of registration at Cornell or undergo an X-ray upon arrival. X-ray service is available at the Gannett Health Center. Residents of the following areas are exempt from this chest X-ray requirement:

Before registration at the university, all students must present proof of adequate immunization against diphtheria, tetanus, rubella, measles, and poliomyelitis.

Registration

Any nonimmigrant foreign student planning to take a leave of absence should check first with the International Students and Scholars Office. Students taking a leave or withdrawing from the university normally cannot legally remain in the United States. Students graduating or leaving the university should file a Notice of Departure with the Office of International Students and Scholars Office. Students intending to transfer to other universities in the United States should check the immigration regulations regarding transfer in the International Students and Scholars Office.

Visa regulations also stipulate that students must carry at least twelve credits each term. Foreign students who are petitioning to drop their course load below twelve credits should contact the International Students and Scholars Office to determine how such a decision will affect their visa status and financial aid.

Leaves of Absence, Withdrawals, Transfers, Credit-Hour Reductions

Any nonimmigrant foreign student planning to take a leave of absence should check first with the International Students and Scholars Office. Students taking a leave or withdrawing from the university normally cannot legally remain in the United States. Students graduating or leaving the university should file a Notice of Departure with the Office of International Students and Scholars Office. Students intending to transfer to other universities in the United States should check the immigration regulations regarding transfer in the International Students and Scholars Office.

Visa regulations also stipulate that students must carry at least twelve credits each term. Foreign students who are petitioning to drop their course load below twelve credits should contact the International Students and Scholars Office to determine how such a decision will affect their visa status and financial aid.
Personal Counseling Services

University Health Services. Counseling services are provided in the health center and the Psychological Service. For an appointment at the Psychological Service, students may call 255-5208 or go to the center. Workshops are also offered on a variety of health-related and personal-growth issues. More information may be obtained by calling Health Education at 255-4782.

Cornell United Religious Work (CURW). Diverse religious staff and denominational advisers provide general, religious, premarrige, couples, or crisis counseling and are available day or night by contacting the office, 118 Anabel Taylor Hall (telephone: 255-4214).

Empathy, Assistance, and Referral Service (EARS). Trained volunteers staff a walk-in and telephone peer counseling service for individual counseling and referral. EARS counselors are also available to present workshops on a variety of topics, including communication and listening skills, stress management, sexual harassment, and rape. Students can walk in to 211 Willard Straight Hall or call 255-EARS.

The Dean of Students Office provides crisis intervention, short-term counseling, and referral for students with adjustment, personal, relationship, and off-campus housing concerns; faculty and staff consultation; communication skills training; and coordination of EARS, ALERT, and personal-growth workshops on various topics. The office is located in 103 Barnes Hall (telephone: 255-4221 or 255-3608).

Suicide Prevention and Crisis Service is a twenty-four-hour hot-line and referral service for the entire community. In addition to crisis counseling, it provides hot-line and referral services for raped or battered women (telephone: 272-4816).

Student Life and Activities

Dean of Students Office

The primary aim of the Dean of Students Office (DOS) is the personal, social, and intellectual development of students and the enhancement of the quality of the educational environment for the benefit of the entire community.

Specific responsibilities of the office include training and development of peer counseling groups such as EARS (Empathy, Assistance, and Referral Service); personal-growth groups that address student concerns in a supportive environment; new-student programs; fraternity and sorority advising; and off-campus life and housing. The office assists individuals who need to know which university department is best equipped to answer any particular question that may arise during the course of the year.

Staff serve as advocates for, and as consultants to, campus groups serving to resolve problems or improve programs. In addition, DOS assumes responsibility for organizing and supporting ad hoc groups to examine issues that cut across divisional boundaries, for example, racism, human relations, and alcohol abuse.

Another major responsibility of the office is the assessment and improvement of the university community through research and organizational development.

Various publications are prepared by the DOS, including the Cornell Calendar: Policy Notebook for Students, Faculty and Staff; Off-Campus Housing in the Ithaca Area, Graduate Life at Cornell, and A Guide to Off-Campus Housing.

Students and staff are always welcome to drop in at the office in Barnes Hall or call (telephone: 255-6839) if they have any questions or concerns.

Housing

Students choose to live on campus for many different reasons. Some appreciate the convenience of being close to classrooms, libraries, laboratories, and other campus facilities. Others enjoy the opportunities to meet new people and to develop a sense of community with other students. Although new students are not required to live on campus, many find that such a community environment helps to ease the adjustment to university life.

To further enrich the college experience, the Department of Residence Life staffs its residences with trained students and professionals who, in addition to administering the halls and working to create a desirable community in them, assist students with personal and academic problems. The staff members know the community’s resources and are committed to helping each student benefit to the fullest extent from the college experience.

Department staff members also work with students in developing quality programs, projects, and social activities in the residence halls. Through a variety of programs, students explore personal and social issues, make new friends, and discover new opportunities for personal growth. In addition, some halls have been designated residential program houses, which concentrate their programming on specific themes, while others have faculty-in-residence and faculty fellow programs that promote informal faculty-student interaction.

There is sufficient variety among university residences to meet the desires and needs of most students. The living-arrangement options include twenty-one residence halls and one town-house community for undergraduates; eight residential program houses, where activities and programs center around a theme; ten small residences, where the students share in the work and management of the house; and three residence halls and two small residences for graduate students.

New students. Each year more students than can be accommodated want to live on campus. Consequently, admission to Cornell guarantees a room assignment for freshmen but not for transfer or graduate students.

Continuing students. Because the demand for on-campus housing exceeds the amount of space available for continuing students, rooms in the traditional residence halls are allocated through a lottery system. Residential program houses and the small residences select their new members from the students who apply for membership. Most undergraduates who want to live on campus are accommodated through the room allocation process. A limited amount of space is available for graduate students.

Personal property. Personal property is not insured by the university, nor is the university liable for loss of, or damage to, any article of personal property. Students are encouraged to take out personal property insurance on their belongings. Information on personal property insurance is available at the Dean of Students Office in 103 Barnes Hall.

Refund policies. The Department of Residence Life refund policies are listed in the section "Terms of Conditions for Single Student Housing" of the residence hall contract.

Further information. Information concerning university housing is available from the Department of Residence Life, Cornell University, 1142 North Balch Hall, Ithaca, New York 14853-1401 (telephone: 607/255-5368). The Off-Campus Housing Office lists information on off-campus accommodations—rooms, apartments, houses, and mobile homes—that has been voluntarily submitted by owners of local rental properties. Because the lists are constantly changing, it is not possible to mail them to prospective tenants. The Off-Campus Housing Office is unable to make arrangements or negotiate contracts on behalf of students. If you have further questions or would like a copy of the booklet Guide to Off-Campus Housing, contact the Off-Campus Housing Office, Cornell University, 103 Barnes Hall, Ithaca, New York 14853-1601 (telephone: 607/255-5373).

Dining Services

Cornell Dining provides a variety of food-service programs for the entire Cornell community.

Co-op Dining

Co-op dining is a completely voluntary dining plan serving Cornell’s undergraduates, graduate students, and other members of the Cornell community. Any student may join.

Co-op dining offers twelve flexible meal-plan options. These options provide a variety of time and meal periods on a five- or seven-day basis. Members are not penalized for switching meal plans to better meet their individual academic routines. Maximum flexibility is included with a two-meal-a-day plan that offers a choice of breakfast or lunch, and dinner daily. Another plan offered is Seven-Saver. Basically a declining-balance points system, Seven-Saver has all the advantages of a cash à la carte without the 7 percent state sales tax.

Members eat in convenient dining rooms, located in the residential areas or on the central campus, and are free to select the dining rooms of their choice for each meal. All dining rooms serve a variety of entrees (including one vegetarian entrée at both lunch and dinner) each day. In addition, "steak nights" and specials highlight the Co-op dining program. Specials may include

outdoor barbecues, midnight breakfasts, ice cream sprees, or the Cross-Country Gourmet dinner series, which has won national acclaim. Menus are posted weekly.

The cost of each meal-plan option is set at the beginning of each academic year and is automatically billed on a semester basis. Members do not pay New York State sales tax, which is 7 percent.

The Co-op plans include meals during university recess periods, including fall semester break, Thanksgiving, Christmas intersession, spring recess, and summer. However, a point system called Break is available for overnight care and emergency outpatient care.

For a medical appointment, a student should call 255-4082 or go to the center. For an appointment at the Psychological Service, a student should call 255-5208 or go to the offices at the center. A doctor is available for emergencies twenty-four hours a day (telephone: 255-5165).

The following services are usually offered on-site:
1) unlimited visits to Gannett Health Center
2) overnight care
3) routine diagnostic and X-ray examinations as ordered by Health Services clinicians and performed by Health Services staff
4) physical therapy service
5) counseling services at the center and in the Psychological Service
6) allergy injections
7) immunizations, vaccinations, and inoculations for travel abroad
8) contraceptive care
9) health education
10) athletic events
11) physical examinations

Generally, the University Health Services' clinicians will coordinate off-site care. Referrals for specialty care may be made to private physicians or private health-care facilities for hospitalization, consultation, surgical procedures, eye examinations for glasses, or prenatal or obstetrical care.

There are fees for some of the services provided on-site, and all of the services provided off-site. The student is also responsible for expenses connected with illness or injury occurring (a) outside of Ithaca while in transit to and from college, or (b) on vacations away from Ithaca during the academic year and during the summer, unless the student is enrolled as a summer student.

To cover many of the services not provided free of charge by University Health Services, all full-time registered students and students studying in absentia are automatically enrolled in an accident and sickness insurance plan, underwritten by a private insurance company, that includes a $50,000 major-medical provision. The plan covers hospital care, charges for surgical procedures, consultations with a private physician or specialist if referral is by a Health Services physician, expenses connected with illness or injury outside of Ithaca, and on vacations away from Ithaca during the academic year.

To be covered and not charged for this plan, the reimbursement is controlled by the provisions of the insurance policy. Students are covered by this plan for the entire twelve months. Only by returning a yearly waiver form, which is mailed with the first bursar's bill or available at Gannett Health Center, the bursar's office at 250 Day Hall, and at university registration, will students be covered and not charged for this plan. The cost of the plan for 1987-88 will be approximately $220 for the entire twelve months, and the charge will appear on each student's fall tuition bill. Unless students have other health insurance to supplement medical services provided by the University Health Services, they are strongly urged to take advantage of this plan. After the waiver process has been completed, a student may be reinstated if the parents' insurance plan drops the student at a certain age or if the student's marital status changes. Application must be made within thirty days of discontinuation of other coverage.

Students who are enrolled in the accident and sickness insurance plan may also enroll their spouses and children for an annual premium. Information concerning this insurance may be obtained at Gannett Health Center or by telephoning 255-6363.

The center's medical staff, under the supervision of the medical director, consists of attending physicians and health associates from the university staff, and consulting physicians and surgeons from the Ithaca area. All medical records are strictly confidential.

The Co-op dining program is administered by Cornell Dining, 233 Day Hall (telephone: 255-8581). Each year, all new and transfer students receive a program description and contract. All terms and conditions of the Co-op dining program are given in the contract, which all prospective members should read carefully before completing and mailing the application.

Dining facilities are open. Please inquire at 233 Day Hall before each recess.

The Co-op dining program is administered by Cornell Dining, 233 Day Hall (telephone: 255-8581). Each year, all new and transfer students receive a program description and contract. All terms and conditions of the Co-op dining program are given in the contract, which all prospective members should read carefully before completing and mailing the application.

Dining locations each day: the Ivy Room at Willard Straight Hall, Noyes Lodge, Martha's in Martha Van Rensselaer Hall. All cash dining units accept cash, Cornellcard, MasterCard, VISA, American Express, and Diner's Club cards. Dining service at each unit follows the posted hours of operation but may be limited during the summer session, or university recesses such as Thanksgiving, Christmas intersession, and spring break.

Entrepot offers a variety of grocery items, beverages, magazines, and personal items. A convenient sundry shop and a campus store are also provided. Entrepot is located on the lower level of Noyes Lodge (telephone: 255-5314).

Vending operations provide food, beverage, and snack items in many campus buildings (telephone: 255-5385).

Catering Cornell Catering serves the entire Cornell community, either in its private dining rooms, located on the third floor of Robert Purcell Union, or at functions held in many campus locations. Cornell Catering offers food service for a variety of occasions or needs (telephone: 255-5555).

Kosher Dining Kosher meals are offered under the auspices of Young Israel of Cornell. Meals are served seven days a week under a wide variety of meal-plan options. Further information is available by writing to the Steward, Young Israel of Cornell, 106 West Avenue, Ithaca, New York 14850.

University Health Services The University Health Services provides comprehensive medical care for all full-time undergraduate and graduate students enrolled at Cornell University in Ithaca. Gannett Health Center, located at 10 Central Avenue, adjacent to Willard Straight Hall, is open twenty-four hours a day during the school year and is available for overnight care and emergency outpatient service outside normal working hours. Normal hours are Monday through Friday from 8:30 to 11:30 a.m. and from 1:00 to 4:30 p.m. and Saturday from 8:30 a.m. to 12:30 p.m.

Students' spouses are eligible for benefits identical to those of the student health-care program on a prepaid or fee-for-service basis. These services are not to be confused with the supplementary accident and sickness insurance plan, the terms for the spouse program may be obtained by writing or visiting the University Health Services, Gannett Health Center, Cornell University, 10 Central Avenue, Ithaca, New York 14853-3101.

Cornell United Religious Work Cornell United Religious Work (CURW) coordinates religious affairs at Cornell. Participants in CURW may be involved in denominational, interreligious, or nondenominational activities. The denominational programs include daily or weekly opportunities for worship, study, and interaction. CURW member groups share in support and leadership of interreligious programs such as the Sage Chapel services, CIVITAS (Cornell-ithaca-Volunteers-in-Training-and-Service), noncredit courses, lectures, conferences, and involvement in varied services to the university community. A diverse staff of pastoral counselors and advisors is available day or night for consultation, may be reached through the office, 118 Anabel Taylor Hall (telephone: 255-4214). This office also has information concerning weekly religious services in Sage Chapel and worship opportunities in the local churches and synagogue. Anabel Taylor Hall houses the Commons, a coffeehouse providing a place for informal communication between faculty, staff, and students. Closely associated with CURW, but independent of it, is the Center for Religion, Ethics, and Social Policy (CRESPP), the nondenominational research and action component of religious affairs at Cornell.
facilities includes dining areas, browsing libraries, a theater, billiard and game rooms, study lounges, meeting rooms, a pottery shop, a tailor shop, darkrooms, and a unisex hair-styling salon. Among the many special services available to students are a central ticket office, a central reservations office for campus facilities; a rental service for audiovisual equipment and phonograph records; dry-cleaning service; service desks where newspapers, magazines, and sundries are sold; an art-lending library, and a check-cashing service.

Unions and Activities programming organizations include programming and policy boards that govern each of the three union facilities, as well as the following: the Alfalfa Room, the Third World Student Center, and Warren Hall where sundries and snacks are sold; Cornell Cinema, the campus film program, the Cornell Concert Commission, which produces popular concerts; the University Unions Program Board, which presents major lectures, touring theatrical productions, and major social events, including Mardi Gras and Springfest; Wilderness Reflections, which presents summer orientation programs for new students in an outdoor setting; and the Third World Student Programming Board, which presents events to highlight minority and ethnic cultures. These services and activities support the educational objectives of Cornell, provide opportunities for personal relationships among members of the community, and fulfill Williard Straight's objective: "the enrichment of the human contacts of student life.

Union Hours
Willard Straight Hall 7:00 a.m. - 11:00 p.m., 7 days a week
Noyes Center 8:00 a.m. - 1:30 a.m., Monday-Friday 10:00 a.m. - 1:30 a.m., Saturday and Sunday (Dining opens at 7:00 a.m. Monday-Friday)
Robert Purcell 7:00 a.m. - 1:30 a.m., Monday - Saturday 7:00 a.m. - 1:00 a.m., Sunday (Hungry Bear Diner: 10:00 p.m. - 2:00 a.m. Sunday-Thursday; 10:00 p.m. - 3:00 a.m. Friday and Saturday)

Fraternities and Sororities
For many students, fraternity or sorority life is an integral part of the Cornell experience. There are currently forty-seven fraternities at the university, with over twenty-five hundred members; thirty-eight sororities, with over one thousand members; and over 2,000 special interest groups, including many that are unaffiliated with fraternities or sororities. The interfraternity council, the Panhellenic Council, and the Black Greek Council administer these organizations.

Athletics
At Cornell, athletics is designed to encourage the participation of every interested student in varsity sports or the extensive intramural program. Cornell supports one of the largest intercollegiate athletics programs for men and women in the country and belongs to the Ivy League and the ECAC. Both men and women compete in the NCAA in basketball, cross-country, fencing, gymnastics, ice hockey, lacrosse, sailing, soccer, swimming, tennis, and indoor and outdoor track; men in baseball, varsity football, golf, squash, and wrestling; and women in field hockey, volleyball, skiing, and water polo. Cornell also competes in intercollegiate team and solo sports for men and women and in lightweight football and lightweight crew for men.

Information Services
The Information and Referral Center assists students, faculty, staff, and visitors by distributing free literature, answering questions, and giving directions. The center responds to questions over the telephone, in the mail, and on a walk-in basis. Questions to which answers are not readily available will be researched by the center staff. The center's aim is to minimize confusion and to help people avoid the necessity of contacting several offices with their questions. The center is in Day Hall near the East Avenue entrance and is open Monday through Saturday from 9:00 a.m. to 5:00 p.m. The telephone number is 607-255-6200.

Campus Tours.
Guided walking tours start from the Information and Referral Center, inside the main entrance of Day Hall, except Independence Day, the day preceding Thanksgiving Day through the following Sunday, and December 20 through January 1. During the January intersession and spring break it is advisable to call the center to confirm the schedule. The tours, which give a general introduction to the campus, leave at the times listed below:

- April 1 - October 31: 11:15 a.m. Weekdays: 11:15 a.m. Weekdays: 1:30 p.m. Saturday: 11:15 a.m. Saturday: 11:15 a.m. Sunday: 1:00 p.m. Sunday: 1:00 p.m.

Transportation Services
Traffic and Parking
To provide a safe walking environment for pedestrians on campus and to reduce the impact of motor vehicles on the limited campus parking facilities, Cornell has restricted vehicle access to the central campus. Cornell University encourages ride sharing and the use of alternative modes of transportation such as public transit, bicycling, and walking.

All on-campus parking (except in certain metered and time-zone areas) is by permit only and is subject to posted restrictions; vehicles without a valid permit are subject to removal by the police department. No vehicles (including motorcycles and mopeds) in their possession which may at any time be parked on campus. This registration information ensures that the owner or operator may be rapidly identified and contacted if necessary; for example, if a parked vehicle is involved in an accident, must be moved immediately, or has been left with its lights on. There is no charge for vehicle registration; however, a registration sticker is not in itself a parking permit.

Information on traffic and parking regulations, and parking permits, is available at the traffic and information booths on campus and at the Traffic Bureau on Maple Avenue. The bureau will be glad to assist any individual with general inquiries or special problems and requests (telephone: 255-PARK).
Bus Service
The Cornell campus is served by a number of public transit routes during the day and evening. CU Transit provides on-campus service as well as commuter services to outlying communities. Several community bus routes connect the university with other surrounding residential and commercial areas.
Information about CU Transit and other transit services may be obtained by calling the Office of Transportation Services at 255-PARK or CU Transit at 255-RIDE. Schedules for on-campus and off-campus service are posted in bus-stop shelters and are available from the Traffic Bureau, the Information and Referral Center in the Day Hall lobby, Robert Purcell Union, and the Willard Straight Hall information desk.

Public Safety Services

Emergencies
Accidents, crimes, fires, and all other emergencies on campus should be reported immediately to the Department of Public Safety (telephone: 255-1111). The Department of Public Safety is located in G2 Barton Hall and is open twenty-four hours a day. Public telephones to report emergencies, seek information, or report suspicious activity are located throughout the campus and can be readily recognized by blue lights above them.

Lost and Found
The central Lost and Found Office, operated by the Department of Public Safety, is located in G2 Barton Hall and is open twenty-four hours a day. Public telephones to report lost articles, seek information, or report suspicious activity are located throughout the campus and can be readily recognized by blue lights above them.

Auxiliary Patrol Services Section
The Auxiliary Patrol Services Section is responsible for scheduling and staffing extra university functions that require public safety personnel for traffic direction or crowd control. The manager may be contacted at 255-8948.

Crime Prevention Section
The Crime Prevention Section provides lectures and orientation to various university groups on topics ranging from general public safety services to drug abuse, crime prevention, and rape and assault prevention. Persons interested in these free programs should contact the manager of the Crime Prevention Section at 255-7604.

University Registration

University registration is the process by which the university registrar and colleges certify the eligibility of students to enroll in courses and purchase or use a variety of services available at the university, such as CornellCard, Co-op dining, libraries, special bus passes, and housing. University registration includes the issue and validation of the student identification card and the collection of information needed for the student directory and state and federal reports. University registration is based on the student’s clearing past and current financial obligations by the date posted on the bursar’s bill. ID validation and college registration are held on the dates stated in the university calendar at a time and place announced in advance of the beginning of each semester.

Required Immunization
Before registration at the university all students must be prepared to present proof of adequate immunization against diphtheria, tetanus, rubella, measles, and poliomyelitis.

Late Registration
A student clearing his or her financial obligations after the stated date on the bursar’s bill is considered late. Late registrants are assessed a finance charge on the bursar’s bill. The university does not permit after-the-fact registration in which persons attend classes and pass courses before seeking to register and receive official course credit.

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 registrar will notify the appropriate college or school about such cases and ask that office to contact the person concerned.

Late Course Enrollment and Late Drop/Add/Change Fees
Students may adjust their schedules during drop/add/change periods. The length of the periods varies according to colleges. A form is completed by the student and signed by both the student’s adviser and an appropriate representative of the department offering the course (an instructor, department staff member, or college registrar, depending on the college). The completed and signed form must be returned to the student’s college office to be processed. See the chart below for the course drop/add/change fee.

Course Enrollment
Course enrollment for each semester at Cornell takes place partway through the preceding semester. Dates are announced in advance and are usually posted in the school and college offices. Course enrollment generally runs for two weeks. Each college or school notifies students about special procedures. Students are often expected to meet with their advisers during this two-week period to check that the courses they plan to take will ensure satisfactory progress toward a degree. Students complete an optical-mark course enrollment form, then return the form to their college office. Each student is sent a course confirmation statement listing the courses processed from the enrollment form. Class schedules are distributed later by the college offices, often during the same days as university registration.

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

Students who fail to submit a course enrollment form during the designated period may be charged a late fee. The fees are listed in the chart in the following section.

Course Drop/Add/Change Period

<table>
<thead>
<tr>
<th>Academic Unit</th>
<th>Late Course Enrollment Fee</th>
<th>Late Course Drop/Add Change Fee</th>
</tr>
</thead>
<tbody>
<tr>
<td>College of Agriculture and Life Sciences</td>
<td>No fee</td>
<td>No fee</td>
</tr>
<tr>
<td>College of Architecture, Art, and Planning</td>
<td>$10</td>
<td>$10*</td>
</tr>
<tr>
<td>College of Arts and Sciences</td>
<td>$10*</td>
<td>$10*</td>
</tr>
<tr>
<td>College of Engineering</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>Graduate School</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>School of Hotel Administration</td>
<td>No fee</td>
<td>No fee</td>
</tr>
<tr>
<td>College of Human Ecology</td>
<td>$10</td>
<td>$10*</td>
</tr>
<tr>
<td>School of Industrial and Labor Relations</td>
<td>No fee</td>
<td>No fee</td>
</tr>
<tr>
<td>Johnson Graduate School of Management</td>
<td>$10</td>
<td>$10</td>
</tr>
<tr>
<td>Athletics and physical education</td>
<td>$25</td>
<td>$25</td>
</tr>
<tr>
<td>Summer session and extramural courses</td>
<td>†</td>
<td>†</td>
</tr>
<tr>
<td>Division of Unclassified Students</td>
<td>No fee</td>
<td>No fee</td>
</tr>
<tr>
<td>Veterinary medicine</td>
<td>No fee</td>
<td>No fee</td>
</tr>
</tbody>
</table>

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

Class Attendance and Absences

Students are expected to be present throughout each term at all meetings of courses for which they are registered. The right to excuse a student from class rests at all times with the faculty member in charge of that class. All lectures, recitations, and similar exercises start at 8:00 a.m., 9:05 a.m., 10:10 a.m., 11:15 a.m., 12:20 p.m., 1:25 p.m., 2:30 p.m., or 3:35 p.m. and last fifty minutes, except that on Tuesday and Thursday the first and second, the third and fourth, the fifth and sixth, and the seventh and eighth periods may be combined to allow for longer meeting times.

All laboratories and similar exercises that continue for 1 hour and 55 minutes, 2 hours and 25 minutes, or 3 hours are scheduled as shown below.

Schedule for Classes Longer than Fifty Minutes

<table>
<thead>
<tr>
<th>Time</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 hour and 55 minutes</td>
<td>1:25 p.m., 2:30 p.m., 3:35 p.m.</td>
</tr>
<tr>
<td>2 hours and 25 minutes</td>
<td>2:00 p.m., 2:30 p.m., 3:35 p.m.</td>
</tr>
<tr>
<td>3 hours</td>
<td>3:00 p.m., 3:30 p.m., 4:30 p.m.</td>
</tr>
</tbody>
</table>

On Monday, Tuesday, Wednesday, and Thursday the hours of 4:25 p.m. to 7:30 p.m.; on Friday the hours after 4:25 p.m.; on Saturday the hours after 12:05 p.m., and all day Sunday are free from all formal undergraduate class or laboratory exercises.

Evening classes are held only on Monday and Wednesday and only when regularly scheduled and included in written college announcements or when recommended by the Committee on Academic Records and Instruction. Evening lectures, recitations, and similar exercises start at 7:30 and 8:35 p.m.; evening laboratories and similar exercises start at 7:30 p.m.

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 such examinations will be scheduled with the examination and room coordinator in the Office of the University Registrar. The dates and times of these examinations are listed in the Course and Room Roster for each term.

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 will 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 one-half hours in length at the discretion of the department concerned. Examinations not listed in the registrar’s examination schedule will be arranged by the professor in charge and must fall within the announced examination period, except by the express permission of the dean of the faculty in accordance with existing faculty legislation.

Auditing Courses

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

Leaves and Withdrawals

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

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

Medical leaves are granted and processed through University Health Services.

Internal Transfers

Transfer from one undergraduate unit to another is not guaranteed. A student in good standing may apply to transfer from one college to another within the university. It is necessary for an internal transfer to inform the admitting college of the acceptance of admission within seven days of the offer of admission. Students interested in transfer within the university should consult with the appropriate school or college office.

Privacy of Records

According to federal law, grades are restricted information and may be released only to the student or at the student’s written request. Thus grades earned on examinations or in courses may not be posted by name. Posting by student ID number is, however, permissible. Although there is no federal or state legislation that pertains to the manner in which graded work is to be returned to students, the returning of such materials should be handled in such a manner as will preserve the student’s privacy.

Course Numbering System

The course levels have been assigned as follows:

- 100-level course—introductory course, no prerequisites, open to all qualified students
- 200-level course—lower-division course, open to freshmen and sophomores, may have prerequisites
- 300-level course—upper-division course, open to juniors and seniors, prerequisites
- 400-level course—upper-division course, open to seniors and graduate students, 200- and 300-level course prerequisites or equivalent
- 500-level course—graduate-level course
- 600-level course—graduate-level course
- 700-level course—graduate-level course
- 800-level course—master’s level, thesis, research
- 900-level course—doctoral level, thesis, research

Guide to Course Listings

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
- Biological Sciences
- Engineering
- Hotel Administration
- Human Ecology
- Industrial and Labor Relations
- Nutritional Sciences
- Officer Education

**Group 2:** Graduate professional divisions

- Law
- Management
- Veterinary Medicine

There are no courses offered by the Graduate School as a unit; graduate-level courses are contained in the various departments that offer the instruction. Within each division, courses are generally arranged in alphabetical order by department and in numerical order within the departments. All courses, 0—999, are briefly described for those divisions (group 1) offering instruction to both undergraduate and graduate students. Courses in the graduate professional divisions (group 2) are designated by number and title only.

It is not possible to keep this single-volume course list completely up-to-date. The most current information regarding course schedules, sections, rooms, credits, and registration procedures may be found in the Course and Time Roster and the Course and Room Roster, each issued twice a year by the Office of the University Registrar. Students are also advised to consult the individual college and department offices for up-to-date course information.

The University

The University Registrar
Grading Guidelines

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

\[
\begin{align*}
A+ &= 4.3 \\
A &= 4.0 \\
A- &= 3.7 \\
B+ &= 3.3 \\
B &= 3.0 \\
B- &= 2.7 \\
C+ &= 2.3 \\
C &= 2.0 \\
C- &= 1.7 \\
D+ &= 1.3 \\
D &= 1.0 \\
D- &= 0.7 \\
F &= 0.0
\end{align*}
\]

This is how a term average is computed:

<table>
<thead>
<tr>
<th>Course</th>
<th>Grade</th>
<th>Quality Points</th>
<th>Credits</th>
<th>Product</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemistry 103</td>
<td>B+</td>
<td>3.3</td>
<td>3</td>
<td>9.9</td>
</tr>
<tr>
<td>English 151</td>
<td>C</td>
<td>1.7</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td>DEA 145</td>
<td>B</td>
<td>3.0</td>
<td>4</td>
<td>12.0</td>
</tr>
<tr>
<td>CHE 100</td>
<td>B</td>
<td>3.0</td>
<td>3</td>
<td>9.0</td>
</tr>
<tr>
<td>DEA 111</td>
<td>C</td>
<td>2.0</td>
<td>3</td>
<td>6.0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>16</td>
<td>42.0</td>
</tr>
</tbody>
</table>

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

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

Incomplete

The symbol of Incomplete is only appropriate 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.

An 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 an Incomplete, reasons for requesting an Incomplete 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 Incomplete and the restriction, if any.

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

Changes in Grades

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

Official Transcripts

An official transcript is one that bears the official seal of the university and the 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, 222 Day Hall.

University Requirements for Graduation

For 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 offices.

Physical Education

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

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

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

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

Swim test. All new students who do not pass a basic seventy-five-yard swim test are required to include swimming in their program of physical education unless they are excused by Gannett Health Center. All nonswimmers are required to register in beginning swim classes.

Student Responsibilities

In extracurricular affairs and conduct, Cornell students have today, as they had in the university’s infancy, maximum freedom to govern themselves and responsibility for the use they make of this freedom. The student, both as an individual and as a member of any student organization, however, is responsible for adhering to all applicable regulations set forth in the Policy Handbook for Students, Faculty and Staff. Copies of this booklet are available in the Dean of Students Office. In addition to the Campus Code of Conduct, the Policy Handbook contains a Statement of Student Rights, a Code of Academic Integrity, the university policy on access to and release of student records, information on the university judicial system, library and motor vehicle regulations, and other policies and regulations.

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

The university policy on access to and release of student records conforms to the Family Educational Rights and Privacy Act of 1974. See the Policy Handbook for Students, Faculty and Staff for details of university policy.

Bursar Information

Tuition, Fees, and Expenses

Tuition for Academic Year 1987–88

Endowed Divisions
Undergraduate
Architecture, Art, and Planning
Arts and Sciences
Engineering
Hotel Administration
Unclassified division
Graduate
Graduate School (with major chairman in an endowed division)
Professional
Law School
Management

Statutory Divisions
Undergraduate
Agriculture and Life Sciences
Human Ecology
Industrial and Labor Relations
New York resident*
Nonresident*
Graduate
Graduate School (with major chairman in agriculture, human ecology, or industrial and labor relations)
Graduate School—veterinary medicine
Professional
Veterinary medicine
New York resident*
Nonresident*
Summer Session (1987)
Per credit
Extramural Division
Per credit
Other Tuition and Fees
In absenta fees
Graduate
Undergraduate
Law and Management
Excess hours tuition rate for students in statutory units taking extra endowed credits
Per credit
The amount, time, and manner of payment of tuition, fees, or other charges may be changed at any time without notice.

Acceptance Deposit
An acceptance deposit of $200 is required of all entering undergraduate students. If a student does not enter in the semester for which the deposit is paid, or does not formally withdraw before July 1 for the fall semester or December 1 for the spring semester, or does not complete at least one semester at the university, the deposit is forfeited. The acceptance deposit will not be credited to the student’s bursar accounts in the entering semester and cannot be used against semester charges. The deposit will be refunded after the student’s final semester at Cornell.

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. Students who terminate their registration with the university during a fall or spring semester in this manner will be charged tuition from the university registration day through the date of their request as follows: first six days of the semester (including university registration day), no charge; seventh day of the semester, 10 percent; second week, 20 percent; third week, 30 percent; fourth week, 40 percent; fifth week, 60 percent; sixth week, 80 percent; seventh week to the end of the semester, 100 percent.

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

Billing and Payment

Billing
Tuition and room and board charges will be billed in July and December and must be paid prior to registration. All other charges, credits, and payments will appear on monthly statements mailed before the tenth of every month.

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

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

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

Payments
An individual who has outstanding indebtedness to the university will not be allowed to register or reregister in the university, receive a transcript of record, have academic credits certified, be granted a leave of absence, or have a degree conferred. If students’ bills show a previous unpaid balance, they must arrange for payment by August 14 if they plan to register for the fall semester. 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
Introduction

The university. Since the Office of the Bursar does not have detailed records concerning many items that appear on a bill, students should contact the office involved if they have questions.

For further information, students should contact the Office of the Bursar, Cornell University, 260 Day Hall, Ithaca, New York 14853-2801 (Telephone: 607/255-2336).

Cornell Installment Plan (CIP)

Cornell offers to all students a monthly installment plan for payment of university expenses. Information about this plan is mailed to parents of continuing students in April of each year and to parents of incoming freshmen and transfers in May of each year.

Multiple-Year Tuition Prepayment Plan

This plan is available to the parents of students who are not financial aid recipients. Two, three, or four years' tuition may be paid at the tuition rate in effect for the next full school year. Future tuition increases do not affect participants for the duration of their prepayment plan. For further information, interested persons should contact the Office of the Bursar, Cornell University, 260 Day Hall, Ithaca, New York 14853-2801 (telephone: 607/255-2336).

Accident and Sickness Insurance

The accident and sickness insurance charge on the July billing statement is for insurance for hospitalization, surgical fees, and major medical coverage for the period of August 28, 1987, through August 25, 1988. The cost of this insurance is lower than the average cost of comparable coverage under other group accident and health insurance policies. A brochure is included with the August bill.

For those who do not want medical insurance coverage, a medical insurance waiver form (included with the bursar's statement mailed in mid-July) must be completed and returned no later than September 28, 1987. Waivers cannot be processed after this date. If a waiver form is lost or destroyed, a replacement can be obtained by contacting the Gannett Health Center (telephone: 607/255-6363).

Tuition Refund Insurance

To provide a more comprehensive refund program, Cornell makes available the Tuition Refund Plan. This plan provides refunds of tuition in the event of absence or withdrawal for medical or emotional reasons. Students should contact the Office of the Bursar for further information.

Cornellcard

Cornellcard is a university charge card that can be used for making purchases on campus. Any registered, full-time, matriculated student may apply for a Cornellcard by filling out an agreement form. A $5 annual nonrefundable fee is assessed the first time a charge is made. The replacement fee for a lost card is $15. Itemized monthly statements, which are mailed to students, must be paid by the due date on the statement, or finance charges of 1 1/2 percent per month (15 percent annual rate) will be assessed. All accounts must be paid in full before each registration period. Accounts with unpaid balances at the close of a semester (other than for the current monthly charges) may not be renewed, and university registration will not be permitted, nor transcripts issued or degrees conferred, until the past-due balance has been paid. The Cornellcard is nontransferable. Loss, theft, or possible unauthorized use should be reported immediately to the Cornellcard Office, 260 Day Hall (telephone: 607/255-6324). The maximum permissible account balance at any one time is $400. Credit privileges will be suspended without notice on any account in excess of the credit ceiling. A brochure is available on request from the Office of the Bursar.

Bad-Check Policy

Any check not honored by a bank will be charged to a student's bursar account, along with a fine for the returned check, according to the following schedule:

<table>
<thead>
<tr>
<th>Returned Check Amount</th>
<th>Fine</th>
</tr>
</thead>
<tbody>
<tr>
<td>up to $50</td>
<td>$10</td>
</tr>
<tr>
<td>$50.01-$200</td>
<td>15</td>
</tr>
<tr>
<td>over $200</td>
<td>25</td>
</tr>
</tbody>
</table>

These charges will be subject to a finance charge at the rate of 1 1/2 percent per month (15 percent annual rate).

Check-cashing privileges will be suspended for at least one semester for anyone who writes two or more bad checks during the semester. In addition, Cornellcard charging privileges will be suspended. Students who issue four bad checks are subject to disciplinary action through the university judicial system and will have their check-cashing privileges permanently suspended along with Cornellcard charging privileges.

Money Management

Some students have difficulty managing their resources to meet expenses. Students should plan for their expenses carefully, using the cost-of-attendance figures in the brochure Financial Aid Information, 1987–88 as a guide. Brochures are also available describing housing on and off campus and dining plans.

The consequences of not paying university bills are severe. A student may not register for a new term until all charges are paid for preceding terms. Degrees will not be conferred and transcripts will not be sent until all university charges, including Cornellcard, are paid.

Programs of Financial Assistance

Cornell University offers a variety of scholarships, grants, employment opportunities, and loans to students who demonstrate financial need. Since requirements and application procedures may differ among programs, students are encouraged to contact the appropriate office for specific information.

Application deadlines, program information, and job listings are available through CLINFO, the university's computerized information system. In addition, financial aid and student employment issues are discussed in regular newsletters distributed by the Office of Financial Aid and Student Employment.

For information concerning financial aid programs, consult the following offices:

- Graduate School of Management: S. C. Johnson Graduate School of Management, Office of Admissions and Student Affairs, Cornell University, 312 Malott Hall, Ithaca, New York 14853-4201 (607/255-7248).
- College of Veterinary Medicine: New York State College of Veterinary Medicine, Cornell University, C106 Schurman Hall, Ithaca, New York 14853-6401 (607/253-3765).

Eligibility

To be eligible for assistance a student must be enrolled full-time in a degree program at Cornell, or be eligible to register in a college or division, and not owe a refund from any grant or loan or be in default on any loan received to attend Cornell. Students on leaves of absence and undergraduates registered in absentia are not eligible to receive Cornell assistance.

New students and continuing-aid recipients who have met application deadlines have top priority for receiving undergraduate aid. Continuing undergraduates applying for aid for the first time are considered on the basis of remaining funds.

To determine eligibility for the need-based assistance at the undergraduate level the university follows closely, but does not strictly adhere to, the need analysis procedures established by the College Scholarship Service. In addition, the composition of the financial aid package (proportion of self-help/scholarship) is influenced by the ratings of the college or school admissions selection committees. Financial aid packages will not change because of less-than-expected academic performance for at least two years from the date of the initial award. However, as in the past, aid packages may vary in subsequent years on the basis of changes in family financial circumstances, increased costs, and the availability of federal funds.
Non-University Financial Aid

State loan proceeds are usually disbursed by a check made payable jointly to the student and Cornell University. Guaranteed Student Loan (GSL) checks are sent to the bursar’s office and are credited to the student’s account after the student endorses the check. Finance charges on state loan amounts are not waived unless Cornell is responsible for late processing of the loan application.

National Merit Scholarships are paid in the form of a check from the National Merit Scholarship Corporation that is sent to the Office of Financial Aid. Because those checks are received after tuition payments are due, the Office of Financial Aid authorizes a deferred credit each semester in the amount of those scholarships prior to receipt of the check.

Other scholarships from sources outside the university are considered part of the financial aid award. With the exception of state and federal grants and faculty tuition benefits, the first $500 of any outside scholarship will be used to reduce expected self-help (loan or work). Fifty percent of the remaining amount will also be used to reduce self-help until the self-help minimum is reached, while the remaining fifty percent will reduce university scholarship aid. Once the self-help minimum is reached, all scholarships in this category will reduce university grants.

Scholarships from sources outside the university are credited to the student’s initial bill from the bursar if checks are received prior to the date the bill is prepared. Checks received after the initial billing will be applied toward unpaid charges. Any finance charges caused by the late receipt of checks for outside scholarships will be the student’s responsibility. It is important, therefore, that the student arrange with any outside scholarship donors to have checks mailed to the university Office of Financial Aid as promptly as possible. If all university charges have been paid at the time the outside scholarship is deposited, a refund check will be issued to the student. These checks may be picked up in 260 Day Hall.

Undergraduate students receiving aid from the university are required to report receipt of any outside scholarship resources to the Office of Financial Aid.

The New York State Tuition Assistance Program (TAP) is for students who are New York State residents and whose New York State net taxable income for 1986 was $32,000 or less. Students from families with higher incomes may qualify for an award if more than one child is in college. TAP awards range from $175 to $1,425 per semester. Students must apply annually for awards by completing a TAP application and mailing it to the New York State Higher Education Services Corporation (NYHESC). An award certificate is sent by NYHESC to inform applicants of their award eligibility. A copy of the award certificate must be submitted by the student to the Office of the Bursar before credit can be claimed. In disbursing awards to students’ accounts, the university is responsible for certifying the amount of tuition due and that each recipient is enrolled full-time in an approved program and is in good academic standing. The definitions of each of these terms are as follows:

Enrolled full-time: registered for 12 credits or more per semester.

Good academic standing:
1) Pursuit of program: Freshmen are required to complete a minimum of 6 credits per semester; sophomores, 9 credits per semester; and juniors and seniors, 12 credits per semester. Standards for gradate students are determined by each recipient’s Special Committee.
2) Satisfactory academic progress: Each recipient must maintain eligibility to reregister each semester.

Any New York State resident receiving a tuition benefit administered by Cornell is required to apply for a TAP award. (Graduate students receiving aid from Cornell for their tuition who are eligible for TAP and choose not to apply will be billed $600 per semester.)

The TAP program is administered by the Office of the Bursar, 260 Day Hall (telephone: 607/255-8414).

The Cornell Tradition

The Cornell Tradition is a unique program of financial assistance for undergraduates. The program is made possible through the generosity and support of alumni and friends of the university. It seeks to reward those undergraduate men and women who demonstrate a commitment to the work ethic by funding a portion of their education expenses.

The Cornell Tradition offers four fellowship programs and a summer job program. Fellowship programs are restricted to students receiving need-based financial aid from the university. The Summer Job Network is available to any undergraduate regardless of financial need.

Freshman and Transfer Fellowships. Students are nominated for fellowships during the admission process on the basis of work experience, leadership, and scholarship achievements. Fellows may receive up to $2,500 to replace the recommended loan during their first year of study at Cornell.

Academic Year Fellowship. Students must apply during the spring semester. Fellows are chosen on the basis of work experience, leadership, and scholarship achievements and may receive up to $2,500 to replace the recommended loan in the next year’s financial aid package.

Summer Fellowship. This is available only to Cornell Tradition fellows and students placed through the Summer Job Network. Students may receive up to $2,500 to replace the recommended loan in the next year’s financial aid package.

Summer Job Network. Students must apply by the end of the fall semester. Accepted candidates are offered referred to career-related summer job opportunities developed by a nationwide network of alumni volunteers.

More information regarding the Cornell Tradition can be obtained from the Student Employment Office, 203A Day Hall.

Financial Aid Services

Counseling on individual financial aid problems and questions is available from trained counselors in the Office of Financial Aid. Appointments may be made at the reception desk at the Office of Financial Aid, located in 203 Day Hall. Parents are welcome, though it is suggested that appointments be verified before visiting the campus. Peer advisers are also available to answer routine questions regarding application procedures and sources of aid.

Orientation Sessions

Although attendance at orientation sessions is not required, the Office of Financial Aid strongly recommends that all new undergraduate financial aid recipients and their parents attend one of the financial aid orientation sessions listed in the Cornell orientation program. A schedule of orientation events is available from the Dean of Students Office.

Student Employment Services

The Student Employment Office (SEO), at 203A Day Hall, has counselors available to assist students in locating part-time employment during the academic year and full-time employment for the summer. A variety of programs and services are administered and available through the Student Employment Office, including the College Work-Study Program, non-work-study job opportunities, the Cornell Tradition, resolution of employee-employer conflicts, information regarding the student employee job-classification and wage-scale system, and off-campus job opportunities.

Information regarding job postings, programs, and application deadlines is available through the SEO, CUINFO, Scoop Sheet (a monthly newsletter for students who work) and “Student Employment Notes” (a column in the Cornell Daily Sun).

Statement of Student Rights and Responsibilities

1) Students have the right to be informed of, and to apply for, all financial aid programs for which they are eligible and have the responsibility to apply by program deadlines and to acquaint themselves with the application procedure.
2) Students have the right to know how financial need and award packages will be determined and to request a review of the financial aid package should circumstances change to negatively affect the family’s ability to meet costs of attendance, and have the responsibility to notify the university should new resources become available to the student that were not originally considered.
3) Students who borrow from the university have a right to full disclosure of the terms and provisions of loan programs, including typical repayment schedules, and have the responsibility to attend loan and exit interviews before borrowing and leaving the university. They must repay loans on a timely basis and keep the university informed of their current address.
4) Students have the right to be informed of financial aid policies and have the responsibility to be aware of all published financial aid policies and to comply with these policies.
5) Students have the responsibility to submit accurate information on all university documents relating to the financial aid application process.
New York State College of Agriculture and Life Sciences

Administration
David L. Call, dean
Kenneth E. Wing, associate dean
George J. Conneman, director of instruction
Elizabeth A. Offenac, associate director of instruction
Norman R. Scott, director of research
Brian F. Chabot, associate director of research
Lucinda A. Noble, director of cooperative extension
Edwin B. Oyer, director of international agriculture

Office of Instruction Staff
Student services: Donald Burgett, Patricia Long,
Catherine Thompson
Records: Tom Wakula
Registrar: Ruth Stanton
Scheduling: Cathy Place
Admissions: Richard Church, Susan Miller,
Nancy Rehkugler, Randy Stewart
Career development: William Alberta

Department Chairpersons
Agricultural economics: R. J. Kalter, Warren Hall
Agricultural engineering: G. E. Rehkugler,
Riley-Robb Hall
Agronomy: R. J. Wagenet, Emerson Hall
Animal science: J. M. Elliot, Morrison Hall
Communication: R. D. Colle, Roberts Hall
Education: J. P. Bail, Roberts Hall
Entomology: R. A. Morse, Comstock Hall
Forestry and ornamental horticulture: C. F. Gortzig,
Stocking Hall
Floriculture and ornamental horticulture: C. F. Gortzig,
Plant Science Building
Food science: R. A. Ledford, Stocking Hall
Microbiology: R. P. Mortlock, Stocking Hall
Natural resources: R. T. Oglesby, Fernow Hall
Plant breeding and biometry: W. D. Pardee,
Morrison Hall
Animal science: R. Quaas, Morrison Hall
*Biochemistry, Molecular and Cell Biology;
G. Feigenson, Clark Hall
Biometry: G. Casella, Warren Hall
*Botany, M. Parthasarathy, Emerson Hall
Communication [M.P. S.(Agr.)], R. Osman, Roberts Hall
Development Sociology: F. Young, Warren Hall
*Ecology and Evolutionary Biology. P. Marks, Corson Hall
Education [also M. A. T.], J. Millman, Roberts Hall
Entomology: G. Eickwolf, Comstock Hall
Environmental Toxicology, J. Fessenden-Raden, Clark Hall
Floriculture and Ornamental Horticulture, R. Langhans,
Plant Science Building
Food Science and Technology, D. Miller, Stocking Hall
*Genetics, T. Fox, Bradford Hall
*International Agricultural and Rural Development [M.P.S.(Agr.)], E. Oyer, Caldwell Hall
Landscape Architecture [M.L.A.], L. Mirin, W. Sibley Hall
Landscape Architecture [M.P.S.(Agr.)], E. Oyer, Caldwell Hall
Microbiology, P. Greenberg, Stocking Hall
Natural Resources, J. Kelley, Fernow Hall
*Nutroecology and Behavior, P. Sherman, Seeley Mudd Hall
Nutrition, B. Lewis, Martha Van Rensselaer Hall
*Physiology, D. Tapper, Veterinary Research Tower
Plant Breeding, R. Coffman, Emerson Hall
Plant Pathology, S. Beer, Plant Science Building
Plant Protection [M.P.S.(Agr.)], P. Arness, Plant Science Building
Pathology, S. Beer, Plant Science Building
Vegetable Crops, P. Ludford, Plant Science Building

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

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

Roberts Hall serves as headquarters for the administrative units, including offices of the deans and directors of instruction, research, and cooperative extension. The offices of the director of instruction and the college registrar are in 192 Roberts Hall; the Admissions Office is in 195. Information about career planning, placement, academic programs, and counseling may be obtained in 17 Roberts Hall.

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

Degree Programs

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

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

Graduate Degrees

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

Current graduate field representatives are also listed.

- Agriculture [M.P.S.(Agr.)], G. Connenman, Roberts Hall
- Agricultural Economics, W. Lesser, Warren Hall
- Agricultural Engineering, L. Albright, Riley-Robb Hall
- Agronomy, T. Setter, Bradford Hall
- Animal Breeding, D. Van Vleck, Morrison Hall
- Animal Science, R. Quaas, Morrison Hall
- *Biochemistry, Molecular and Cell Biology; G. Feigenson, Clark Hall
- Biometry, G. Casella, Warren Hall
- *Botany, M. Parthasarathy, Emerson Hall
- Communication [M.P. S.(A.C.)], R. Osman, Roberts Hall
- Development Sociology, F. Young, Warren Hall
- *Ecology and Evolutionary Biology. P. Marks, Corson Hall
- Education [also M. A. T.], J. Millman, Roberts Hall
- Entomology: G. Eickwolf, Comstock Hall
- Environmental Toxicology, J. Fessenden-Raden, Clark Hall
- Floriculture and Ornamental Horticulture, R. Langhans, Plant Science Building
- Food Science and Technology, D. Miller, Stocking Hall
- *Genetics, T. Fox, Bradford Hall
- *International Agricultural and Rural Development [M.P.S.(Agr.)], E. Oyer, Caldwell Hall
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- Natural Resources, J. Kelley, Fernow Hall
- *Nutroecology and Behavior, P. Sherman, Seeley Mudd Hall
- Nutrition, B. Lewis, Martha Van Rensselaer Hall
- *Physiology, D. Tapper, Veterinary Research Tower
- Plant Breeding, R. Coffman, Emerson Hall
- Plant Pathology, S. Beer, Plant Science Building
- Plant Protection [M.P.S.(Agr.)], P. Arness, Plant Science Building
- Pathology, S. Beer, Plant Science Building
- Vegetable Crops, P. Ludford, Plant Science Building

* Division of Biological Sciences

Bachelor of Science Degree

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

Agricultural Economics: O. Forker, 308 Warren Hall
Agricultural Engineering: G. Rehkugler, 104 Riley-Robb Hall

Summary of Basic College Requirements for Graduation

1. Credit Hours
   a. Minimum: 120
   b. Minimum with letter grade: 100
   c. Maximum independent study: 15
   d. Minimum College of Agriculture and Life Sciences: 55
   e. Maximum from endowed colleges without additional charge: 55
   f. Maximum transferred in: 60; minimum at Cornell: 60

2. Residence
   a. Normally, eight full-time semesters
   b. Seven semesters, if all other degree requirements are met, with a grade-point average of 2.0
   c. Minimum of 12 credits per semester
   d. Minimum of two semesters in the College of Agriculture and Life Sciences (residency in the Division of Unclassified Students (DUS) does not count toward residency in the college)
   e. Students who have eight semesters in residence at Cornell, including two in the college, and who have eight or fewer credits remaining for graduation may petition for approval to complete this work elsewhere.

3. Physical Education
   a. Completion of university requirement for two terms of work
   b. Transfer students may be exempt from part or all of the requirement.

   Note: Requests for postponement or exemption should be made in writing to the University Faculty Committee on Physical Education. Questions should be referred to Alan Gantert, Teagle Hall (255-4286).

4. Grade-Point Average (GPA)
   a. Cumulative GPA: 1.7 or above must be maintained
   b. Final GPA: 1.7 for a minimum of 12 credits in last term

   Note: Only grades earned at Cornell and while registered in the college are included.

5. Distribution
   a. Completion of university requirement for two terms of work
   b. Transfer students may be exempt from part or all of the requirement.

   Note: Requests for postponement or exemption should be made in writing to the University Faculty Committee on Physical Education. Questions should be referred to Alan Gantert, Teagle Hall (255-4286).

   Note: Only grades earned at Cornell and while registered in the college are included.

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   b. Seven semesters, if all other degree requirements are met, with a grade-point average of 2.0
   c. Minimum of 12 credits per semester
   d. Minimum of two semesters in the College of Agriculture and Life Sciences (residency in the Division of Unclassified Students (DUS) does not count toward residency in the college)
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gain an appreciation of the variability of living organisms. The social sciences and humanities give students perspective on the structure and values of the society in which we live. Through development of written and oral expression skills, students master the essentials of effective communication.

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

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

Agricultural Engineering 208–209
Agronomy 131
Astronomy
Chemistry
Geology
*Mathematics (excluding Education 005 and Mathematics 109)
Education 115
Physics

*The college mathematics requirement is described below.

Group B. Biological Sciences. 9 credits, including 6 of introductory biological science

Biological Sciences (except 201, 202, 205, 206, 301, 302)
Animal Sciences 220, 221
Entomology 212
Microbiology
Plant Breeding 225
Plant Pathology 301, 309

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

Social Sciences. 100- or 200-level courses in the following departments (excluding Freshman Seminars):

Archaeology
Anthropology
Economics
Government (including Africana Studies 190)
Psychology (including Education 110)
Sociology (including Rural Sociology)

Humanities. 100-, 200-, or 300-level courses in the following departments (excluding Freshman Seminars and language courses):

Africana Studies (humanities and history)
Asian and Near Eastern Studies
Classics
Comparative Literature
English (literature only)
French, German, Italian, Russian and Spanish (literature only)
History and History of Art/Architecture
Music and Theatre Arts (theory, literature, and history only)

Philosophy (also Natural Resources 407)

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

Freshman Seminars
Communication 161, 201, 350, 352, 360, 363, 365
Hotel Administration 265

6. Mathematics

The faculty requires minimum competency in mathematics as a requisite to satisfactory pursuit of a degree. All students must complete, with a passing grade, one course in mathematics as part of the physical sciences requirement. Advanced placement credit in mathematics or transfer credit in a college calculus course may be presented to meet this requirement.

a. The ALS Mathematics Placement test: All entering undergraduates, except those presenting advanced placement or transfer credit in college calculus, must take the test, which is administered free of charge just prior to registration each semester. No student may repeat the placement test. It consists of fifty sample questions from arithmetic, algebra, geometry, trigonometry, and basic calculus. The index score is determined by the number of correct answers minus one quarter of the number of incorrect answers.

b. The index score is used to help students select appropriate courses. If a high index score is attained, the mathematics requirement in physical sciences is waived. If a low index score (equal to or less than 12) is attained, the student is to enroll in Education 005 before selecting a mathematics course to fulfill the requirement.

c. When presenting mathematics transfer credit, a student may:

1. include precalculus credits along with the calculus credits
2. transfer up to 6 credits to the physical sciences requirement, if the index score is 30 or above
3. not transfer any credit to the physical sciences requirement if the index score is from 13 to 20 (credit may, however, be counted toward graduation)
4. not transfer any credit in mathematics if the index score is below 13

7. Faculty Adviser

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

b. Course enrollment each semester should be planned in consultation with the faculty adviser. The signature of the faculty adviser indicates approval of, or at least consent to, the choice of courses made and is required before the course enrollment can be processed.

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

8. Progress toward the Degree

a. The progress of each student toward meeting the degree requirements is recorded each term in the college registrar’s office on a summary of record form.

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

c. Graduation with distinction: Students who rank in the top 10 percent of the college’s graduates on the basis of the GPA for the last 60 credits completed at Cornell will be graduated with distinction.

Most students come from New York State, but nearly 20 percent come from other parts of the United States or abroad. About half of the undergraduates are women. Approximately 10 percent are identified as members of minority ethnic groups.

Transfer Students

Any student who has withdrawn from one college and has been accepted in another is considered a transfer student. Approximately 20 percent of the ALS undergraduate students are transfers who have taken part of their collegiate work at community colleges, agricultural and technical colleges, or other four-year institutions. Many of them hold an associate degree.

A Cornell student in good standing may apply for intra-university transfer to pursue a course of study unavailable in his or her current college. Guidelines are available in the Admissions Office of the College of Agriculture and Life Sciences, 195 Roberts Hall. The procedure includes filing a transfer request and submitting a letter explaining reasons for making the transfer.

Consideration is given to students who have demonstrated an interest in their intended field of study by taking appropriate prerequisite courses and courses within this area of study. Academic achievement is also considered. Students are seldom allowed to transfer during their freshman year.

In some cases a student may be referred to the Division of Unclassified Students to study for one semester before entering the college. A second semester is considered under unusual circumstances. During this trial semester the student must achieve a predetermined average (usually 2.7) and take approved courses to assure acceptance.

Special Students

A limited number of non-degree candidates who want to take selected courses in the college are admitted each year. Applicants should submit the standard Cornell application, a résumé of their work experience, and a list of the courses they want to take. For more information, students should contact the Admissions Office, 195 Roberts Hall.

Part-time Students

All students in the College of Agriculture and Life Sciences are expected to be enrolled as full-time students in a registered program of study. Part-time students must register in the Division of Summer Session, Extramural Courses, and Related Programs. The Continuing Education Center, 103 Barnes Hall, provides information, counseling, and special programs for mature students throughout the university.

Off-Campus Students

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

Withdrawal

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

Graduation

Diplomas are prepared by the Office of the University Registrar and distributed to those who have completed the degree requirements and have been approved by the college faculty.
Academic Integrity Policy

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

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

1) Students assume responsibility for the content and integrity of the work they submit, such as papers, examinations, or reports.

2) Students are guilty of violating the code if they:
   • knowingly represent the work of others as their own;
   • use or obtain unauthorized assistance in any academic work;
   • give fraudulent assistance to another student;
   • fabricate data in support of laboratory or field work;
   • forge a signature to certify completion or approval of work;
   • knowingly deprive other students of library resources, laboratory equipment, computer programs, and similar aids;
   • in any other manner violate the principle of absolute integrity.

3) Faculty members assume responsibility to make clear to students and teaching assistants specific regulations that apply to scholarly work in a discipline.

4) Faculty members fulfill their responsibility to:
   • maintain in all class, laboratory, and examination activities an atmosphere conducive to academic integrity and honor;
   • make clear the conditions under which examinations are to be given;
   • make clear the consequences of violating any aspects of the code;
   • provide opportunities for students to discuss the content of courses with each other and help each other to master that content and distinguish those activities from course assignments that are meant to test what students can do on their own without help from others;
   • state explicitly the procedures for use of materials taken from published sources and the methods appropriate to a discipline by which students must cite the sources of such materials;
   • approve in advance, in consultation with other faculty members, which work submitted by a student and used by a faculty member to determine a grade in a course may be submitted by that student in a different course;
   • monitor the work and maintain such records as will support the crucial underpinning of all guidelines: the students’ submitted work must be their own and no one else’s.

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

The Academic Integrity Hearing Board for the College of Agriculture and Life Sciences consists of three elected faculty members, three elected student members, a chairman appointed by the dean, and the coordinator of student services, who serves as a nonvoting record keeper. Professor J. Buglisi is the current chairman.

Academic Policies and Procedures

Records

The college registrar maintains for each student a complete record of academic achievement. A permanent record card is on file for each matriculated student and is updated whenever new information becomes available. Staff members are available in 192 Roberts Hall to consult with students regarding the assignment of credit toward meeting distribution and elective requirements and to verify the official summary of record.

The college Committee on Academic Achievement and Petitions is a standing committee of six college faculty members and two students. On behalf of the faculty and subject to its review, the committee:

• reviews, at the end of each semester and at other times as shall seem appropriate to the committee, the progress of all students not meeting academic requirements;
• receives and acts upon petitions from individual students asking for exceptions from particular academic regulations or requirements of the college, or for reconsideration of action previously taken by the committee;
• acts upon readmission requests from persons whose previous enrollment was terminated by the committee;
• notifies the petitioner in writing of the action taken by the committee.

Good academic standing means a student is eligible for, or has been allowed to register and enroll in, academic course work for the current semester. Whether an individual student is in good academic standing is determined by the college registrar and the Committee on Academic Achievement and Petitions.

A petition to be exempt from a college academic requirement or regulation may be filed by any student who has grounds for exemption. Forms are available in the Office of Student Services, 17 Roberts Hall.

A petition is usually prepared with the assistance of a student’s faculty adviser, whose signature is required; it indicates the adviser’s awareness of the petition. The advisor’s recommendation is helpful to the committee. The committee determines whether there is evidence of mitigating and unforeseen circumstances beyond the control of the student that would warrant an exemption or other action.

Registration Procedures

All students must register with the university at the beginning of each semester. Registration materials are available at a time and place announced each term by the Office of the University Registrar.

Course Enrollment Procedures

To enroll in courses, students pick up materials from the college Scheduling Office. 192 Roberts Hall; plan a schedule in consultation with their adviser; and return the completed forms to the Scheduling Office for verification and processing. Course enrollment forms are generated on the basis of the property filed course enrollment forms.

To enroll in courses that involve independent study, teaching, or research, a student must file an independent study statement. Students who will be studying off campus or abroad should file the intent to
Agriculture and Life Sciences

Study off campus form to ensure that proper registration will occur. Both forms are available from the college registrar, 192 Roberts Hall.

Students may enroll again for a course in which they received a grade of F in a previous semester. The grade received the second time will be recorded and both grades calculated as part of their GPA.

Students should not enroll again for a course in which they received an incomplete. Work for that course should be completed. The instructor will file a change of grade form.

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

A student is held responsible for and receives a grade for those courses in which he or she enrolls unless the student officially changes such enrollment. All changes in courses or credit, grading options, or sections must be made by the student at the Scheduling Office, 192 Roberts Hall, on an official form provided for that purpose.

Add/Drop/Changes are made by filing properly signed forms in the Scheduling Office, 192 Roberts Hall. Approval and signature of the faculty adviser and course instructor are required to add or drop a course.

Students may add courses during the first three weeks of the term and may drop courses until the end of the sixth week.

Students wishing to withdraw from a course after the end of the sixth week must petition to the college Committee on Academic Achievement and Petitions. A form is available in 17 Roberts Hall. Requests for course changes are approved only when the members of the committee are convinced that unusual circumstances are clearly beyond the control of the student.

The committee assumes that students should have been able to make decisions about course content, total work load, and scheduling prior to the end of the sixth week of the semester.

If the petition to drop a course is approved after the end of the eighth week of classes, the course remains on the student's record and a W (for "withdrawal") is recorded on the transcript.

Grade Reports

Grade reports for the fall term are included in spring-semester registration materials; grade reports for the spring term are mailed to students at their home addresses unless alternative addresses are reported to the college or university registrar by mid-May.

Academic Deficiency Policies

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

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

- semester GPA of at least 1.7
- cumulative GPA of at least 1.7
- satisfactory work in 12 or more credits per semester
- reasonable progress toward completion of distribution requirements
- appropriate completion of college and university requirements

In general terms, regular participation in course work with academic loads at a level sufficient to assure graduation within eight semesters and grades averaging C− (1.7) or higher are prima facie evidence of satisfactory progress.

Dean's List

Students who complete a minimum of 12 credits for letter grades with a semester GPA of 3.00 or above and achieve a satisfactory grade in the physical education requirement will be placed on the Dean's List of the College of Agriculture and Life Sciences for the semester in recognition of their outstanding scholastic record.

Honors Program

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

An undergraduate wishing to enroll in the honors program must have completed at least 55 credits, at least 30 of the 55 at Cornell. Also, the student must have attained a cumulative grade-point average of at least 3.0 at the time of entry.

Interested students must make written application no later than the end of the third week of the first semester of the senior year. An application form is available from the college registrar, 192 Roberts Hall, or from the area committee chairperson. (Biological sciences students should get applications at 118 Stimson Hall.)

Written approval of the faculty member who will direct the research and of the honors committee in the area is required. After the college registrar verifies the student's grade-point average, the student will be officially enrolled in the honors program.

Academic credit may also be earned by enrolling in an appropriate independent study course. When applying for admission to the program, the student may, if appropriate, submit a budget and a modest request for funds to cover some of the costs the student incurs in doing the research.

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

Students in the College of Agriculture and Life Sciences wishing to participate in the honors program must be accepted in one of the program areas approved by the college. Students are not eligible for honors by participating in a program offered by another college or administrative unit.

Animal Sciences

Faculty committee: R. G. Warner, chairman; J. A. Marsh, R. L. Quass

Students interested in the honors program in animal sciences should consult with their faculty advisers early in their junior year. Details pertaining to the specific requirements can be obtained from the office of the chairman, 324 Morrison Hall.

Biological Sciences

Students interested in the honors program in the biological sciences should consult with their faculty adviser early in their junior year. Applications and details pertaining to program requirements may be obtained from the Division Office of Academic Affairs, 118 Stimson Hall. Information on faculty research activities is available in the Behrman Biology Center, G20 Stimson Hall.

Entomology

Faculty committee: W. L. Brown, Jr., chairman; D. Pimentel, M. J. Tauber

An honors program in the area of entomology may be pursued by any qualified student in the College of Agriculture and Life Sciences (see the requirements at the beginning of this section). The student need not be specializing in entomology. Insects, because of their variety, small size, and easy availability, are convenient subjects for study in a laboratory setting. Insects are a part of all ecosystems, and understanding problems relating to insects is essential to the study of living systems. Short life cycles, unique physiologies and developmental patterns, and species with easily managed colony requirements and a wide range of behavioral traits provide the raw material for honors study. Cornell's diverse faculty interests and extensive collections and library in entomology are also major assets if a student selects entomology as the area for honors study.

The honors committee requires that an undergraduate who is interested in embarking upon an honors project proceed with the following steps:

1. Discuss the matter with his or her academic adviser, preferably in the junior year, so that a research project can be carefully planned. The possibility of conducting some research during the junior year and/or summer should be discussed.

2. Discuss the project with an appropriate faculty member in the Department of Entomology who can serve as a supervisor to oversee the honors research. (The faculty adviser will be of assistance in determining which faculty entomologist might be the best supervisor, the decision being based primarily on available faculty members' areas of expertise.)

3. Prepare a brief, tentative plan for the project for discussion and approval of the honors project supervisor. The plan should include a statement of objects or hypotheses, proposed methods for testing hypotheses, needs for equipment or research space or shared equipment, and a budget outlining financial support needed for travel and supplies.

4. Present a completed application to the chairman of the entomology honors committee no later than the end of the third week of the first semester of the senior year. Earlier submission is encouraged.

5. Submit a brief progress report, approved by the project supervisor, to the entomology honors committee by midterm of the semester in which the student will complete his or her graduation requirements.

6. Present a formal seminar reporting the significant findings of the research to the Department of Entomology (preferably as a Juggatea seminar) in the last semester of the senior year.

7. Submit two copies of the final project report (honors thesis) to the chairman of the entomology honors committee no later than two weeks before the last day of classes in the semester in which the student anticipates graduation. The thesis will be reviewed by the faculty honors project supervisor and one other referee from the department honors committee. The committee will return the thesis to the student one week before the last day of classes. If reviewers indicate that changes must be made, the revised thesis should be submitted to the chairman no later than the last day of classes.

Natural Resources

Faculty committee: M. E. Richmond, chairman; J. A. Kelby, R. J. McNichol

The honors program in natural resources provides an opportunity for undergraduates to participate in independent research in the areas of fisheries and aquatic science, forest science, wildlife science, and conservation. The subject matter and nature of the research experience may depend upon the student's interests, but the degree is intended for those in the natural resources major who wish to pursue an intensive research experience. Course work in this program but require the guidance and supervision of a faculty member with substantial interest or expertise in the problem area chosen.
In addition to meeting requirements of the college, the student is expected to do the following:

- Register for the honors program in the junior year.
- Select a faculty adviser who will help identify and formulate a research problem.
- Carry out an independent research effort that is original and separate from the work of others who may be investigating similar subjects.
- Describe and summarize the work in the format of a conventional master's thesis or in the form of a scientific paper ready for journal submission. About half of the theses have been published.
- Work closely with at least two faculty or staff members who will agree to serve as readers for the thesis.
- Provide readers with a copy of the guidelines for evaluation of honors theses, available from the department's honors program committee.

Nutritional Sciences
Faculty committee: D. Levitsky, chairman; C. Campbell, C. Bisogni, M. Morrison

The honors program in nutritional sciences is designed to provide the academically talented undergraduate with the opportunity to participate in a faculty research program. This program is available to students majoring in general studies with a concentration in nutritional sciences. Students are selected in the spring semester of the sophomore year on the basis of scholastic achievement, cumulative grade point average, and motivation for independent study. Students interested in participating in the honors program should consult their faculty advisers or contact committee chairman Professor David A. Levitsky, 118 Savage Hall, and submit their application to the honors committee.

In addition to meeting requirements of the college, to qualify for graduation with honors, students must:

- Maintain high scholastic achievement.
- Satisfactorily complete the junior seminars, NS 398 and 498. Students are required to complete biochemistry by the end of the first semester of the junior year, and strongly encouraged to complete NS 332, Laboratory Methods in Nutritional Sciences, by the end of the junior year.
- Satisfactorily complete NS 499, Honors Problem, with a minimum of 6 credits, during the senior year. To do so they must (1) attend a one-hour senior seminar, fall and spring, (2) submit an independent research problem in consultation with a faculty adviser, (3) submit for approval a written thesis to the division honors committee, (4) present a final seminar on the research, and (5) register for honors with the ALS college registrar by the first two weeks of the senior year.

A copy of the honors program guidelines are available in the division's Undergraduate Office, 335 Martha Van Rensselaer Hall, or from the honors chairman.

Physical Sciences
Faculty committee: D. J. Lathwell, chairman; C. E. McCulloch, J. Y. Parlangie, J. W. Sherbon

The honors program in physical science provides outstanding students with an opportunity to do independent research under the supervision of a faculty member in the Departments of Agricultural Engineering, Agronomy, Food Science, or in the Biometrics Unit.

Students must be enrolled in the program for a minimum of two semesters and must also enroll in the appropriate departmental independent study course for a total of at least 6 credits. They must submit a report of their research to the honors committee at least four weeks prior to the end of instruction of the semester in which they expect to graduate.

Details of the program can be obtained from the chairperson of the physical science honors committee.

Plant Sciences
Faculty committee: M. Petrovic, chairman; L. Creasy, R. L. Oberdorfer, C. Wien, R. P. Kort, S. Zinder

Before acceptance into the program, students must submit an application and a one-page tentative project outline by the end of the second week of classes in the first semester of their senior year. The project outline must be approved by the faculty supervisor and should include a clear statement of the objective(s) of the research, methodology, and needs for space, equipment, and supplies (attached budget required). Full committee approval is needed for acceptance into the program.

Completion of the honors program in plant sciences requires two copies of a report of independent research in the honors program to be submitted to the chairperson of the honors committee before the last day of classes of the semester in which the degree is sought. The report should be written in the format for research publication required by that discipline of plant science in which the student is enrolled. The report must be accompanied by a letter of recommendation from the supervisor of the research, that letter reflecting the student's performance and recommendation for graduation with honors.

The honors committee will review the report, and if a majority of the committee favors the proposal, the chairman will recommend graduation with honors for that student in a letter to the director of instruction. One copy of the report will be returned to the student. The other will be shelved in Mann Library.

Social Sciences
Faculty committee: N. E. Awa, chairman; J. M. Conrad, D. B. Gowin, T. A. Hirsch

Honors degrees are awarded in the behavioral and social sciences upon approval of an honor's thesis reporting a piece of original research in an appropriate area.

The research should deal with a substantive issue within the fields of the behavioral and social sciences. Both the results of the research and the methodology or the argument by which the results were achieved must be reported. Reviews of literature, practical conclusions or applications, or broad characterizations of an area of inquiry may constitute part of the research report but are not themselves sufficient to count as research. While work may originate in prior class work, it is expected that honors will extend it. Students may, however, register for independent study in conjunction with an honors project.

Reports must be written according to the form of any standard journal within the appropriate fields. Four copies of the report should be submitted to the chairperson of the committee no later than three weeks prior to the last day of classes of the semester for which the degree is sought. A supporting letter from the faculty member supervising the work must also be submitted. Approval of the thesis requires a majority vote of the honors committee.

Intercollge Programs

The College of Agriculture and Life Sciences does not participate in any formal degree programs. Study abroad, Bachelor of Science is the only undergraduate degree program offered.

The College of Veterinary Medicine may accept students to double-register in their seventh or eighth semester and complete requirements for the Bachelor of Science degree in the College of Agriculture and Life Sciences. Students should consult with the college registrar, 126 Roberts Hall, to assure that degree requirements have been fulfilled.

Students who have been offered admission to the C. S. Johnson Graduate School of Management upon completion of the B.S. degree in Agriculture and Life Sciences may take a program of management courses in their senior year as a prerequisite to the college faculty adviser as part of their undergraduate program. In certain cases an "upset" tuition charge, equal to the endowed undergraduate tuition rate, will be applied for undergraduate study.

Students attending access credit hours from endowed colleges and schools. Inquiries should be directed to the university bursar.

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

The Program in Landscape Architecture is cosponsored by the Department of Forestry and Ornamental Horticulture in the College of Agriculture and Life Sciences and by the College of Architecture, Art, and Planning. The program offers a professional degree curriculum in landscape architecture at both undergraduate and graduate levels, as well as a graduate second professional degree program.

The Division of Nutritional Sciences is an intercollege unit affiliated with the College of Human Ecology and the College of Agriculture and Life Sciences. The undergraduate nutrition major is in the College of Human Ecology. Students in Agriculture and Life Sciences may study nutrition in areas such as animal sciences, poultry and avian sciences, food-industry management, food science, microbiology, pomology, and vegetable crops. Students may also plan a concentration in biological sciences, option B, or a concentration in general studies in agriculture to include a human nutrition component.

The Program on Science, Technology, and Society is an academic unit that engages in teaching and research involving the interactions of science and technology with social and institutional contexts. The program draws its students, faculty, and research staff from the various divisions of the university, including the College of Agriculture and Life Sciences. It offers an interdisciplinary undergraduate curriculum in Biology and Society. A concentration in the general studies in agriculture major may be planned in consultation with a faculty advisor to include a biology and society component. Further information, including a list of courses, may be obtained from the program office, 632 Clark Hall.

The American Indian Program (AIP) is a multidisciplinary intercollege program with instructional, research, and extension components. The instructional core consists of courses focusing on American Indian life with emphasis on the Iroquois and other Indians of the Northeast. A description of the program and general information is available from the director of the American Indian Program, Caldwell Hall.

The Comparative and Environmental Toxicology Program is an interdisciplinary intercollege program with research, teaching, and cooperative extension components coordinated by the Institute for Comparative and Environmental Toxicology (ICET). Courses are cosponsored by academic departments in several colleges of the University. A description of the program and general information is available from the director of the program through the ICET office, N202 Martha Van Rensselaer Hall.
The Cornell Laboratory of Environmental Applications of Remote Sensing (CLEARs) is an interdisciplinary intercollege center with teaching, research, and extension components affiliated with the College of Agriculture and Life Sciences, the Department of Agriculture and Life Sciences, and the Department of Civil and Environmental Engineering. A description of the program and general information is available from the director through the CLEARs office in Hollister Hall.

Off-Campus Study Programs

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

An intent to Study Off-Campus form should be filed with the college registrar before leaving campus. Tuition is prorated for off-campus study. In some cases stipends or cost of living allowances are provided. Students should consult with the Office of Financial Aid if receiving financial aid and clear all accounts with the bursar prior to departure.

Students who plan to enroll in courses at another institution in the United States must petition to register for study in absentia. Courses should be selected in consultation with the faculty adviser. Approval of the petition, including the list of courses to be taken, guarantees acceptance of transfer credit if grades received are equivalent to C or better. The petition form is available in the Office of Student Services, 17 Roberts Hall, and should be returned there for consideration by the Committee on Academic Achievement and Petitions.

Albany Programs

Study off campus in Albany, the New York State capital, provides a unique opportunity to combine career interests with academic and legislative concerns. Students receive an intensive orientation to state government and attend a lecture-seminar program composed of three two-credit components and offered by professors in residence. An internship experience, supervised by an internship committee, provides up to six academic credits. Independent study and research courses offered by the various departments in ALS and/or courses offered by academic institutions in the Albany area may be elected.

Three opportunities are available. The Assembly Intern Program provides a placement with a member of staff of the New York State Assembly. The Senate Assistants Program has placements with New York State senators and selected staff. The Albany Semester Program provides experience with a state agency such as the Department of Environmental Conservation, Education, or Labor.

Applicants are screened by the ALS Internship Committee in the term prior to assignments. Those accepted should plan a program of study in consultation with their faculty adviser. At least twelve credits must be carried to meet the residence requirement. Seniors should note that the last-term average must be 1.7 or above.

All interns will audit the orientation sessions and meet participation requirements in at least two of the lecture-seminar sections. The paper required in each section constitutes an independent study project to be directed and evaluated by a Cornell faculty member appropriate discipline. If a faculty member will not sponsor more than one of the independent study courses for any one student, to receive academic credit for the internship, students enroll in ALS 400, for an S/U grade only.

Information and applications are available in the Career Development Office, 16 Roberts Hall.

Cornell-in-Washington

Students in all colleges apply for the Cornell-in-Washington program through the Department of Government, 154 McGraw Hall. ALS students admitted to the program should file the off-campus study form with the college registrar prior to leaving campus. Selection of courses should be made in consultation with an Academic Adviser to assure that the courses are appropriate for the degree program being pursued. The course enrollment forms should be filed in the office of the college registrar as soon as course selection is completed and approved.

SEA Semester

Cornell University and the University of New Hampshire offer a semester-long, field-oriented study experience in marine science at a cooperative field station on Appledore Island, Maine, in the historic Isles of Shoals. In cooperation with the Sea Education Association (SEA), a semester sequence of courses may be planned, including a six-week shore component at Woods Hole, Massachusetts, and a six-week sea component aboard the R/V Westward. For more information and an application, students should consult the Cornell Marine Programs Office, 14 Stimson Hall. ALS students should file the intent to study off-campus form with the college registrar as early as possible to ensure proper registration and enrollment in courses.

Internships

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

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

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

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

The College of Agriculture and Life Sciences does not offer internships in Agriculture and Life Sciences.

All students enrolling for an internship must file an independent study, research, teaching, or internship form with the Scheduling Office. If the study is to take place off campus, the Intent to Study Off-Campus form should also be filed with the college registrar.

Overseas Academic Programs

The Cornell Abroad program is open to students in all colleges of the university. Students in the College of Agriculture and Life Sciences should consult with their faculty adviser and the college registrar to ensure that credit received for academic work abroad will meet requirements for graduation. The Office of Student Services, 17 Roberts Hall, has information and application forms.

Cooperative arrangements with the University of Reading, in England, and the University of Dublin, in Ireland, enable the college to endorse several students for a year of study under a tutor in those schools. The Scandinavian Exchange program, operated in cooperation with the Agricultural College of Sweden at Uppsala. The ALS student selected to participate in the Swedish exchange spends the junior year at Uppsala. All expenses and relinquishing of living allowance, are provided by a student group there. Round-trip air transportation must be paid by the student. An exchange student from Uppsala spends a year at Cornell, partially supported by the college and student groups here.

Major Fields of Study

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

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

Agricultural and Biological Engineering

Agricultural and biological engineering links engineering and technology with the biological, social, and agricultural sciences. It is a branch of engineering that serves the agricultural sector all the way from the farm to the consumer. The challenge is to apply engineering principles to solving problems in the agricultural industry. Those problems involve production, processing, distribution, cost, environmental quality, and safety issues and applications. An increasingly important and emerging aspect of this program area is the engineering activity related to the development of biotechnology.

Students in this program area study topics such as bioengineering, food engineering, soil and water conservation, machinery, power, waste management, small scale energy production and management, structures and building design, design and construction of secondary roads and environmental quality control.

The program area, which includes two specializations—engineering and technology—is offered by the Department of Agricultural Engineering. The department is located in Riley-Robb Hall, one of the most complete agricultural engineering facilities in the world.

The agricultural engineering specialization is intended for the student who is particularly interested in the theoretical and fundamental aspects of engineering required for design and research. The student must be highly motivated and have a strong aptitude for mathematics and the sciences. Biological, social, and agricultural sciences are integrated into this specialization, but the physical sciences dominate. The
curriculum is accredited by the Accreditation Board for Engineering and Technology. The specialization is jointly sponsored by the New York State College of Agriculture and Life Sciences and the College of Engineering. Students double register in both colleges during their junior and senior years. The specialization provides excellent preparation for a variety of jobs in industry, especially those serving agriculture. Qualified graduates may also continue study in a Master of Engineering, Master of Science, or doctoral degree program.

For specific course requirements and other information, see the section of the College of Engineering.

The technology specialization emphasizes the applied and technical aspects of agricultural and biological systems. The curriculum integrates courses in basic biological and physical sciences as well as engineering, agronomy, agricultural economics, natural resources, and animal, plant, and food sciences. Interest areas include agricultural systems, biological systems, and environmental systems.

Specific course requirements for the specialization in technology are:

A. Basic Subjects
1. Calculus 8
2. Chemistry 6
3. Physics 6
4. Introductory biological science 6
5. Computer applications 4
6. Statistics or probability 3
7. Economics 3
8. Oral communication 3

B. Advanced and Applied Subjects
1. Five courses in the agricultural, biological, or environmental sciences 15
2. Five engineering courses at the 300 level or above; at least 9 credits in agricultural engineering 15

C. Electives
Additional courses to complete college requirements

D. Total (minimum) 120

For further details on both the agricultural engineering and technology specializations, see the department's undergraduate program brochure, available at 100 Riley-Robb Hall.

Agronomy: Crops, Soils, and Meteorology

Agronomy, crop science, meteorology, soil science, and weed science are offered by the Department of Agronomy, which is located in Bradford and Emerson halls.

Agronomy is the study of crop production and soil management, and as a specialization it provides a broad education in all the agronomic sciences, including aspects of environmental quality. Students are expected to take at least ten credits of both crops and soils courses. In addition, agricultural meteorology, weed science, entomology, plant pathology, and farm management are recommended. Students interested in careers in agribusiness and with government agencies should also consider additional training in communication, applied economics, and computer science.

Crop science is the application of basic biological and ecological concepts to the production and management of field crops. Examples of field crops are alfalfa, corn, soybeans, and wheat. Courses required include general biology, botany, plant physiology, general chemistry, mathematics, computing, crops, and soils. Students who anticipate a career in agricultural production or service after completion of the B.S. degree should take additional courses in crops, soils, crop physiology, economics, communication, plant pathology, entomology, nutrition, general microbiology, and climatology. Students planning graduate or professional study beyond the bachelor's degree should take advanced course work in biochemistry and botany; quantitative, qualitative, and organic chemistry; and calculus, physics, and statistics.

Meteorology is the study of the atmosphere and the processes that shape our weather. The core curriculum in meteorology is designed to provide students with an understanding of the fundamental physical and dynamical properties and processes of the atmosphere. All students are required to complete a minimum of three semesters of calculus, two semesters each of chemistry and physics, and a sequence of five courses covering general, theoretical, and synoptic meteorology. Additional courses are available for students interested in subjects of agricultural meteorology, forecasting, and physical meteorology.

The curriculum satisfies the basic requirements for employment as a professional meteorologist and provides a solid foundation for graduate study or work in the numerous specialized areas of meteorological science. Students are encouraged to choose additional course work in related or complementary areas of interest, such as agriculture, biology, computer science, mathematics, statistics, physics, chemistry, or engineering.

Soil science is the application of basic physical and biological science to the classification, use, and management of soils on an ecologically sound basis. The curriculum in soil science combines training in the physical and biological sciences with a thorough background in science. Students take 16 credits in soil science, including four credits in the introductory course and 12 credits chosen from four of the following five areas: soil geography, soil chemistry, soil physics, soil microbiology, and soil fertility. In addition, 10 credits of chemistry, six credits of mathematics, and six credits of physics, as well as supporting biological sciences courses, are expected to satisfy the major.

 Weed science is that branch of pest management which emphasizes the principles and practice of weed control. The scientific basis for cultural, chemical, and biological control of weeds is provided in an interdisciplinary approach. Students are exposed to featured cooperative courses offered by the Departments of Agronomy, Floriculture and Ornamental Horticulture, and Vegetable Crops so that a variety of managed plant systems may be studied.

Animal Sciences

The animal sciences program area involves two departments—the Department of Animal Science (in Morrison Hall) and the Department of Poultry and Avian Sciences (in Rice Hall)—which offer a coordinated group of courses dealing with the principles of animal breeding, nutrition, physiology, management, and meat science. While emphasis in subject matter is directed toward farm-animal species, including dairy and beef cattle, horses, poultry, pigs, and sheep, students are exposed to other species used in research and teaching programs as well. The departments have extensive facilities for raising animals and well-equipped laboratories and classrooms, including a teaching barn, in which students can gain practical experience in the care and management of large animals at a convenient location on campus.

The program focuses on the application of science to the efficient production of animals for food, fiber, and pleasure and easily accommodates a variety of interests and goals. Beyond a core of basic courses (suggested minimum, 12 credits) students select production (minimum, 6 credits) and advanced (minimum, 6 credits) courses to fulfill an individually tailored program worked out in consultation with their advisers. In this way it is possible to concentrate by species as well as by subject matter (nutrition, physiology, breeding, management, meat science). Dairy management, for example, is a popular program among students who may be preparing to manage a dairy farm or enter a related career. Supporting courses in this area and in farm cooperatives are recommended. Others elect a program heavily oriented towards economics and business in preparation for a career in the poultry, dairy, meat-animal, horse, feed, or meats industries. Students are exposed to courses that can be developed to meet a student's career interests. It is highly recommended that students obtain appropriate fieldwork experience during summers.

Several special training opportunities exist for highly motivated students. Underclassmen whose academic records warrant it may, by arrangement with individual faculty members, engage in research (either for credit or for honors) or assist with teaching (for credit). The Dairy Management Fellows program offers an equally challenging but different type of experience for a highly select group of students.

Applied Economics and Business Management

In applied economics and business management, students may choose several specializations and options. Courses in agricultural economics are supplemented with others in related areas such as computer science, economics, sociology, history, government, industrial and labor relations, hotel administration, consumer economics, animal sciences, plant sciences, natural resources, mathematics, and statistics.

Students with outstanding academic records may apply to coregister in the Johnson Graduate School of Management in their senior year. For information, those interested should contact the Admissions Office, 315 Malott Hall.

The program in applied economics and business management is based in the Department of Agricultural Economics and housed in Warren Hall.

Agricultural economics provides a general program in the economics of the agricultural sector. It is an appropriate major for those students who want to (1) survey offerings in agricultural economics, such as management, marketing, economic development, and policy and resource economics; and (2) prepare for graduate work in agricultural economics.

Business management and marketing applies the principles of economics and the tools of management to prepare students for careers in business. Special emphasis is given to developing decision-making skills and to the study of the structure and practices of business institutions. Market analysis, sales, banking, merchandising, and production management are fields for which students may prepare.

Farm business management and finance is intended for students with farm experience who are interested in farming or in preparing for work in farm management or farm finance, in cooperative extension, and in farm cooperatives.

Food-industry management is designed for students interested in management or sales positions with the processing, manufacturing, or distribution segments of the food industry.

Public affairs management integrates a wide range of subject areas designed to familiarize students with the nature of public affairs and managerial complexities created by the interaction of economic factors in social and political institutions.
Resource economics is an option for students interested in the application of the principles of economics to problems, both public and private, involving natural and human resources.

The program includes core courses in the Department of Agricultural Economics and additional courses in an optional area of concentration. The following core courses are generally required in applied economics and business management:

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>Ag Ec 150</td>
<td>Economics of Agricultural Geography</td>
<td>3</td>
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<td>Ag Ec 220</td>
<td>Introduction to Business Management</td>
<td>3</td>
</tr>
<tr>
<td>Ag Ec 221</td>
<td>Financial Accounting</td>
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<tr>
<td>Ag Ec 310</td>
<td>Introductory Statistics</td>
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Biological Sciences

The program of study in biology is offered by the Division of Biological Sciences. Students enroll in either the College of Agriculture and Life Sciences or the College of Arts and Sciences.

Areas of concentration within the biology major include general biology; animal physiology and anatomy; biochemistry; botany; cell biology; ecology; systematics, and evolution; genetics and development; neurobiology and behavior; and an independent option. Program of study are described under the Division of Biological Sciences.

Communication

Everyone relates to others through the process of communication. Whether these human linkages are personal or through the mass media, there is an increasing need for individuals who can help establish communication relationships and make them more efficient and effective. Individuals who are able to do this must have good communication skills themselves and must comprehend the social psychology of human communication. Students in the Department of Communication have the opportunity to learn both the social science underlying human communication and the most effective means of adapting written, interpersonal, audio, and visual communication to audiences. The curriculum emphasizes learning communication theory along with communication skills. Students elect one of three different sequences by the beginning of their junior year: a communication, publication, or interpersonal communication. Each sequence has a required core of courses that includes Writing for Media, Theories of Human Communication, Introduction to Mass Media, Visual Communication, and Oral Communication.

Public communication prepares students for careers as communication, information, or public relations specialists in a wide variety of organizations. Required courses for this sequence include communication planning and strategy, survey research, communication in organizations, and visual communication. There is heavy emphasis placed on writing skills. Public communication also has a special track emphasizing the structure and application of electronic media.

Publication provides an excellent background for working as an editor or writer in virtually any organization. Such work might include preparing annual reports, editing an employee newspaper, writing sales or marketing literature, or writing news stories. Required courses for this sequence are taken in writing, media law, publication design, and communication theory. Students serve as staff members for the Cornell Countryman for one or two terms. The publication sequence provides students with a good background for science communication.

Interpersonal communication coupled with a carefully designed concentration prepares students for careers in human service professions, such as personnel administration, training, or sales and consulting. The sequence also may be used to prepare for graduate study in communication and other social sciences. Required courses for this sequence are taken in communication theory, survey research, and writing. Electives include such courses as small group communication, listening, persuasion, intercultural communication, and organizational communication.

In addition to the requirements for a sequence, a concentration of at least 12 credits outside the department is required. The concentration helps orient students to a communication career in either business, government, education, or public service organization or to a very specific profession such as agribusines public relations or science communication.

Students are strongly encouraged to seek practical communication experience through part-time or summer employment, the department's internship course, or the campus media. Work experience contributes to a portfolio of professional materials that is invaluable in obtaining a position in communication. Detailed descriptions of the sequences and the guidelines for the selection of elective courses are available from the Department of Communication, 307 Roberts Hall.

Education

The focus in the Department of Education is on how teaching and learning take place in school and nonschool settings, as well as on the role of education in our society. Students study concepts and develop competencies necessary to analyze educational situations critically and to plan, implement, and evaluate educational programs. Students in the program area take a core curriculum:

1. A course in general psychology
2. A course in educational psychology (e.g., Education 311)
3. A course in the social, historical, and philosophical foundations of education (e.g., Education 271, 370, 472)
4. A field experience (e.g., Education 402, 403, 409, 420, 430)

Three specializations are available at the undergraduate level.

Agricultural education. This specialization leads to teaching agriculture in secondary schools and two-year college positions in extension education, and educator jobs in agricultural industry. It is intended for students who have good academic ability, experience in agriculture, and an interest in youth and young adults who would like to study agriculture. The ability to work with people is essential.

Certification is required to teach in public secondary schools. Agricultural certification areas are agricultural mechanization, conservation, farm production and management, horse handling and care, ornamental horticulture, and small-animal care. Provisional certification, good for five years, may be earned by completion of an approved curriculum, including a student teaching experience, leading to the baccalaureate degree. A passing grade on a state teacher's test is also required. Permanent certification requires a master's degree. Persons with a baccalaureate degree in technical agriculture may earn certification through a master's degree in agricultural education.

Directed field experiences, internships, and selected education courses are used to prepare students for agricultural educator positions not requiring certification, such as extension and postsecondary teaching.

Further information is available from the agricultural education coordinator, Roberts Hall (telephone: 255-2197).

General education. By selecting courses in the Department of Education, students prepare for positions in areas such as counselling, youth-group leadership, cooperative extension, and the Peace Corps. Students can also prepare themselves for graduate programs in science education, environmental education, educational psychology, research methods, extension, adult and continuing education, and the social/economic/legal/philosophical foundations of education.

Teacher Education in Science and Mathematics Program. In 1987-88 a program leading to certification in science teaching will begin. Students selected for the program will continue their specialization in the sciences and come to the Department of Education to arrange for courses that will lead to provisional or permanent New York State certification. A program of certification in mathematics education is available at the master's level as well.

Students interested in certification should contact the coordinator, Teacher Education in Science and Mathematics Program, Roberts Hall (telephone: 255-3106).

Entomology

The intent of this curriculum is to provide students with a basic background in the biological and environmental sciences, with a special emphasis on the study of insects. Many students pursue graduate studies in entomology or related sciences upon completion of the B.S. degree, and the requirements are based on a preprofessional degree. Those who do not anticipate graduate training are urged to select electives of immediate value to the careers they plan. Some suggestions are made in section B below.

A. Specific Requirements

Basic Sciences

College mathematics, including calculus
A course in physics
Chemistry 103–104 or 207–208
Chemistry 253 (organics)

General Biology

Introductory biology
Biological Sciences 330 or 331, Principles of Biochemistry
Biological Sciences 311, Introductory Animal Physiology
Biological Sciences 281, Genetics, or Plant Breeding 225, Plant Genetics
Biological Sciences 221, Neurobiology and Behavior
Biological Sciences 360, General Ecology

Entomology

Entomology 212, Insect Biology, or 241, Applied Entomology
Entomology 322, Insect Morphology
Entomology 331, Insect Taxonomy

Two courses selected from the groups below. Both may not be from the same group:

- Group a
  - Entomology 444, Integrated Pest Management
  - Entomology 677, Biological Control
  - Entomology 690, Insect Toxicology and Insecticidal Chemistry

- Group b
  - Entomology 455, Insect Ecology
  - Entomology 471, Ecology and Systematics of Freshwater Invertebrates
The choice of electives should reflect a student’s particular interests within entomology. Two broadly distinct areas of interest are the impact of insects on human welfare and the more basic aspects of insect biology. Courses in botany, evolution, invertebrate zoology, microbiology, cell biology and histology, vertebrate biology statistics, foreign languages, scientific writing, oral communication, plant pathology, and other areas of agriculture are also recommended.

**Food Science**

The food science program area is designed to provide students with the basic skills and knowledge necessary to ensure an adequate food supply. Students may choose from two curricula: food science and food technology. Food science is designed for those interested in the more basic aspects of food technology. Food technology is intended for those interested in the more applied aspects. Students who both curricula take a core of fundamental courses and in consultation with faculty advisors select courses suitable for specific career objectives.

The core is designed to meet minimum guidelines of the Institute of Food Technologists, the professional society of United States food scientists. The flexibility of the food science program allows students to prepare for a variety of positions in industry, government, or education. Some of the positions and areas of work require graduate training, and it can be useful in others as well. Opportunities for graduate study exist at a number of institutions, including Cornell.

During the first two years, students are required to take two-semester introductory courses in biology, chemistry, and physics plus introductory courses in microbiology, calculus, food science, and nutrition. During the last two years, students take courses dealing with the application of science and technology to the processing, preservation, distribution, and utilization of foods. This includes the following required courses: Food Analysis, Food Engineering I, Sanitation and Public Health, Food Processing I and II, Food Chemistry. Sensory and Objective Evaluations of Foods, Food Microbiology, Food Chemistry Laboratory, and introductory statistics. Students also take courses in the social sciences and humanities to meet the general college requirements.

Students may choose additional courses in chemistry, microbiology, or nutrition in preparation for careers in research and development; in mathematics and engineering; for careers in processing and engineering; in marketing and business management; or in a variety of production courses related to specific commodities. Emphasis may be placed on the international aspects of food science.

Students are strongly encouraged to obtain further completion of an emphasis of choice. Lists of recommended courses are available for many areas, but the student is free to select courses for special objectives. The areas of emphasis include processing technology, food chemistry, nutritional aspects of processing, technology and management; dairy science; meat, poultry, and fish technology; food microbiology; and international food development.

The program is offered by the Department of Food Science, housed in Stocking Hall. A full-scale dairy plant and extensive laboratory facilities are available for training, research, and employment.

**Landcape Architecture**

Landscape architecture is a licensed profession that deals with design of the environment to fit human needs. It involves the interaction between elements of the built and natural landscape and realizes creative thought and technical skill in shaping future outdoor environments. Qualifications for licensing include completion of a specified period of approved professional work experience and passing a comprehensive state licensing examination.

**Bachelor of Science Curriculum**

The landscape architecture undergraduate curriculum is a four-year professional program leading to a Bachelor of Science degree. The program is accredited by the American Society of Landscape Architects and is registered with the New York State Education Department, State Board for Landscape Architecture.

The undergraduate curriculum in landscape architecture centers around a three-year sequence of design studio courses that begins in the fall semester of the sophomore year. Transfer applicants are considered for fall-term admission only.

Core courses in design, plant materials, landscape history and theory, landscape planning, landscape materials and construction, graphics, and natural sciences are required throughout the four-year curriculum. Studio courses deal with the application of design methods and principles that reflect knowledge and appreciation of land, water, plants, and the built environment in planning and designing land areas for public and private use. Basic to the curriculum is concern for the creation of environments that meet complex social needs and are ecologically sound and aesthetically pleasing. Requirements for specialization in landscape architecture include satisfactory completion of the core curriculum.

An option for study abroad in Denmark is incorporated into the fall semester of the senior year. Under a special arrangement between Cornell University and the University of Copenhagen, landscape architecture majors who have completed four semesters of design and who have a cumulative average of 3.0 or above have the option of participating in a uniquely developed architecture and design studies curriculum in the Denmark International Study Program in lieu of a semester at Cornell. This program is part of Cornell Abroad and is administered through the Center for International Studies.

**First Year**

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>LA 100, Landscape Architecture</td>
<td>1</td>
</tr>
<tr>
<td>Freshman Orientation</td>
<td></td>
</tr>
<tr>
<td>FI/OH 109, Nature Drawing</td>
<td>3</td>
</tr>
<tr>
<td>Biological sciences elective</td>
<td>3</td>
</tr>
<tr>
<td>Physical sciences elective</td>
<td>3</td>
</tr>
<tr>
<td>Social sciences or humanities elective</td>
<td>3</td>
</tr>
<tr>
<td>Written or oral expression elective</td>
<td>3</td>
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<tr>
<td></td>
<td>16</td>
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</table>

**Second Year**

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 220, Principles of Spatial Design</td>
<td>3</td>
</tr>
<tr>
<td>LA 201, Theory and Application Studio</td>
<td>6</td>
</tr>
<tr>
<td>LA 205, Graphic Communication</td>
<td>3</td>
</tr>
<tr>
<td>FI/OH 313, Woody Plant Materials for Landscape Use</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>15</td>
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</tbody>
</table>

**Spring Term**

| LA 202, Project Design and Site-Planning Studio | 6 |
| LA 310, Site Construction                      | 4 |
| LA 521, History of European Landscape Architecture | 3 |
| Physical sciences elective                     | 3 |
|                                              | 16      |

**Third Year**

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 301, Natural Systems and Planting Design Studio</td>
<td>6</td>
</tr>
<tr>
<td>LA 522, History of American Landscape Architecture</td>
<td>3</td>
</tr>
<tr>
<td>Biological sciences elective</td>
<td>3</td>
</tr>
<tr>
<td>Free elective</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

**Spring Term**

| LA 302, Urban Systems Studio   | 6       |
| Written or oral expression elective | 3 |
| Physical sciences elective     | 3       |
| LA 312, Site Engineering for Landscape Architects | 4 |
|                                | 16      |

**Fourth Year**

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LA 400, Professional Practice Seminar</td>
<td>2</td>
</tr>
<tr>
<td>LA 401, Advanced Project Design and Graphics Studio</td>
<td>6</td>
</tr>
<tr>
<td>LA 520, Contemporary Issues in Landscape Architecture</td>
<td>2</td>
</tr>
<tr>
<td>Biological sciences elective</td>
<td>3</td>
</tr>
<tr>
<td>Free elective</td>
<td>3</td>
</tr>
<tr>
<td>(Optional landscape architecture study abroad semester in Denmark)</td>
<td>16</td>
</tr>
</tbody>
</table>

**Summary of credit requirements**

| Specialization requirements | 69 |
| Distribution electives      | 36 |
| Free electives              | 15 |
| Master of Landscape Architecture (M.L.A.) degree |

**First professional degree curriculum.** The three-year M.L.A. curriculum is accredited by the American Society of Landscape Architects and organized to prepare a student for professional practice in landscape architecture. It is structured to provide a first professional degree for students with a bachelor's degree in areas other than landscape architecture or architecture.

Through a course sequence intended to develop basic landscape architectural skills and concepts, the three-year curriculum provides opportunities for students from diverse educational backgrounds to become proficient in landscape design, site construction, graphic communication, plant materials, and other related areas necessary to enter the profession fully qualified at the master's level.

Requirements of the three-year M.L.A. curriculum include 90 credits, satisfactory completion of the core curriculum courses, an approved summer internship, and a thesis or final project.

**First Year**

<table>
<thead>
<tr>
<th>Fall Term</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>LA 205, Graphic Communication</td>
<td>3</td>
</tr>
<tr>
<td>LA 220, Principles of Spatial Design</td>
<td>3</td>
</tr>
<tr>
<td>LA 500, Graduate Orientation Seminar</td>
<td>1</td>
</tr>
<tr>
<td>LA 501, Theory &amp; Application Studio</td>
<td>6</td>
</tr>
<tr>
<td>LA 520, Contemporary Issues in Landscape Architecture</td>
<td>2</td>
</tr>
<tr>
<td>FI/OH 313, Woody Plant Materials for Landscape Use</td>
<td>3</td>
</tr>
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<td></td>
<td>18</td>
</tr>
</tbody>
</table>
Microbiology touches on clinical, veterinary, public health, agricultural, environmental, and industrial areas. Students in the Department of Microbiology are provided with basic background courses in the biological and physical sciences as well as an introduction to the theoretical and laboratory techniques of basic areas in microbiology, such as microbial physiology, microbiology of pathogens, microbial ecology, and microbial genetics. Fields closely related to microbiology include biochemistry, genetics, food science, animal science, and agronomy. Students are provided with strong laboratory as well as classroom training, and they may prepare for career options in the developing biotechnology industry, in food microbiology and pharmaceutical companies, and in other industries that involve the manipulation of microorganisms for commercial purposes. Students who complete the program are often able to find employment in those areas without further training. They may also find employment as technicians working in hospitals, in government, or in university research laboratories. Many elect to continue their education at the graduate level, either in microbiology or related fields, or to enter professional schools, such as medical, veterinary, or dental colleges.

Courses required for the microbiology major program provide a firm background in basic sciences. They include calculus physics, general chemistry, organic chemistry, biochemistry, and genetics. Microbiology courses required include introductory and advanced general microbiology, microbial genetics, microbial physiology, and pathogenic microbiology or immunology (taught in the College of Veterinary Medicine). It is possible for students with a record of high-quality performance to conduct research projects during their senior year. Elective microbiology courses are available in microbial ecology, food microbiology, bacterial diversity, tissue culture techniques, prokaryotic cytology, soil microbiology, immunology, microbial engineering, and virology. A limited number of students who have fulfilled the departmental course requirements by the end of their junior year may be selected for a Clinical Microbiology Specialization Program. Such students spend their senior year at Cornell Medical College and the New York Hospital, studying and working in clinical microbiology.

More information may be obtained from the Department of Microbiology, Stocking Hall. A pamphlet entitled Microbiology In Your Future can be obtained without charge by writing to the American Society for Microbiology, 1931 Street N.W., Washington, DC 20006.

Natural Resources

The undergraduate curriculum is designed to provide an enduring and broadly applicable education. A strong biological and natural resources base, supplemented by an introduction to the concepts and approaches used in resource management, is emphasized. Students are provided an opportunity to understand the world around them and are exposed to ecological concepts that may form a principal basis for their future decisions and training.

The program is based in the Department of Natural Resources and is housed in Fenow Hall. The Amor Forest Teaching and Research Center, a biological field station and research laboratory, is located somewhat further to the shore of Canada Lake. The campus has facilities for field-oriented courses, workshops, and opportunity for in-residence study, as does the Cornell Biological Field Station, located somewhat further to the shore of Canada Lake.

The curriculum helps prepare students for many useful endeavors and can serve as a base for graduate work in many fields. Students are prepared to appreciate and understand their natural environment and humanity's interactions with it. A foundation is developed for the many students who continue with graduate professional training in natural resource conservation, wildlife science, fishery and aquatic sciences, and related resource programs.

Students are encouraged to study in each of the eight learning areas listed below:

1) Understanding basic substrates for life: geology, soils, meteorology, ecology, water resources
2) Understanding natural processes: chemistry, physics, ecology, field biology
3) Understanding human exploitation of nature's functions: biology, physiology, anatomy, behavior
4) Understanding how people and their institutions function: psychology, sociology, politics, government, history, anthropology, law, economics
5) Identifying and measuring the environment: taxonomy, resource inventory, air-photo interpretation
6) Learning and developing basic life skills: communication, thinking, making decisions, logic, planning, philosophy, ethics, and others
7) Learning special skills: mathematics, statistics, computer science, resource management, law
8) Learning about the world: Students should recognize that not all learning takes place in the classroom. Exploring different careers, participating in campus and community activities, and in independent research all contribute to continuing growth.

Students need not select an area of concentration, but those who wish to do so may specialize further in wildlife science, forest science, aquatic science, and fishery science.

Students should seek relevant work experience to complement their academic studies.

Plant Sciences

Plant sciences students may specialize in general plant science, plant biology, plant breeding, plant pathology, plant protection, field crops, floriculture and ornamental horticulture, pomology, and vegetable crops. Students with well-defined interests may specialize when they enter college. Others may start in the general plant sciences curriculum and, if they desire, specialize after the second year.

Plant sciences is a multidisciplinary program area, sponsored by the Department of Agronomy, in Emerson Hall, and the departments of Floriculture and Ornamental Horticulture, Plant Breeding, Plant Pathology, Pomology, and Vegetable Crops, all located in the Plant Science Building.

General plant science is intended for students whose interest in studying plants has not yet centered on any one of the more specialized groups within the area. Students may continue with this option throughout their undergraduate years, particularly if they are likely to be interested in and qualified for advanced studies beyond the bachelor's degree. Students who plan to seek employment upon graduation may prefer to specialize. There are, however, opportunities for general plant science graduates in the service and supply industries as extension agents, as teachers, and as research technicians.

More than a hundred courses are offered that deal directly with some area of plant science. Other courses relating to plant science are offered in agronomy and biological sciences. In addition, an interest in plant science may be combined with some other area of specialization, such as agricultural engineering, education, extension, statistics, international agriculture, food science, or agricultural economics.

Undergraduates are encouraged to obtain practical experience. It may involve research under the direction of a faculty member or work in a commercial industry or research institute or on a farm. Departments will assist students looking for positions that would provide useful experience.

Floriculture and ornamental horticulture applies principles of plant science and business management to the production and marketing of florist, nursery, and turfgrass crops, as well as to the selection and management of plants for both indoor and outdoor...
The core curriculum consists of the following courses:

Flor 100, Introduction to Floriculture and Ornamental Horticulture
Flor 233, Woody Plant Materials
Flor 312, Garden and Interior Plants I
Flor 401, Principles of Plant Propagation
Bio S 241, Plant Biology (Introductory Botany)
Bio S 242, Plant Physiology (lecture)
Bio S 244, Plant Physiology (laboratory)
Agron 200, Crop Production and Properties of Soils
Entom 241, Applied Entomology, or Entom 212
Insect Biology
Pl Pa 301, Introductory Plant Pathology

Although mastery of those subject areas is considered essential for students planning to enter a floriculture or landscape horticulture career, justifiable exceptions to the core curriculum may be granted by the student's adviser.

With permission of their adviser, transfer students may receive core curriculum credit for similar courses taken at other institutions, provided that transfer credit is granted by the college. In addition, all transfer students must complete a minimum of 12 credits in floriculture and ornamental horticulture courses at Cornell. No more than two of the following landscape architecture courses may be included in this 12-credit requirement: LA 140, LA 220, LA 310, or LA 312. No other landscape architecture or freehand drawing courses may be applied to the requirement because they do not contain horticultural subject matter.

Students are also asked to select an area of emphasis in either floriculture or landscape horticulture by the beginning of their junior year. Specialization in floriculture prepares students for careers in management of the production of crops in greenhouses and wholesale- and retail-marketing, whereas specialization in landscape architecture trains students for careers in nursery-crop production, turfgrass management, landscape contracting and service, retail and wholesale-marketing, and botanical garden and arboretum management, urban horticulture, and related areas. Some students choose to pursue a general program in floriculture or landscape horticulture, including courses in both areas. Similarly, programs in horticultural business management, research, teaching, extension and public education, and communications may be developed by specialization areas. Students wishing to prepare for graduate study in horticulture may develop a program in basic sciences and their application in horticultural science. Lists of recommended courses for the areas of specialization are available from student advisers.

Working with his or her faculty adviser, each student can tailor a program to achieve individual educational objectives in floriculture and landscape horticulture. Students are also encouraged to take courses in these areas: agricultural economics and business management, agricultural engineering, agronomy (soils), computer science, ecology, entomology, geology, plant pathology, plant physiology, oral and written expression, and plant taxonomy. Use of electives to pursue study in the humanities and in other areas of special interest to the student is encouraged and provides opportunities for broadening and enriching learning experiences. Numerous opportunities to become familiar with the horticultural industries and professions are provided through field trips, guest lectures, independent or small-group study, optional and work experience programs.

Questions concerning the undergraduate curriculum, advising, matters relating to student services, or financial aid should be addressed to Dr. Carl F. Gortzig, Chairman, Department of Floriculture and Ornamental Horticulture, 20 Plant Science Building, Ithaca, New York 14853-5908 (telephone: 607-255-3048).

In addition, a number of other subjects pertinent to plant protection are recommended, depending on the student's interests: agricultural economics, agricultural engineering, agronomy, biochemistry, communication arts, pathology and entomology, general physics, genetics, meteorology, mycology, pesticides, in the environment, and plant anatomy. Employment involving practical experience in plant protection between the junior and senior years is encouraged. The job may be on a farm, at an experimental station, within an agrochemical company, or with a regulatory agency.

Pomology (the science of fruit growing) provides students with knowledge of the scientific technology and the influence of environmental factors on the production, handling, and storage of deciduous fruit crops. New York is a national leader in fruit production. An on-farm value of over $165 million generates an estimated $620 million for the state's economy.

Courses are selected by students in consultation with a faculty adviser. Flexibility in programs makes it possible to establish a course of study to fit the desired goals of individual students. The diverse pomology curriculum, complemented by courses in basic sciences and arts and electives in a student's area of interest, prepares pomology majors for a career in fruit production, agricultural business related to the fruit industry, storage and merchandising, or professional pomology. Job opportunities for graduates may be found in fruit production, marketing, sales and service, research, teaching, and extension.

Vegetable crops is one of the most diverse applied and scientific fields in agriculture. In New York more than twenty economically important vegetables are produced and marketed. Vegetable crops have a high value per acre, making it economically feasible to invest relatively large sums in land, equipment, fertilizers, seed, and pesticides. Many vegetables are highly perishable; consequently, considerable expenditure is made for refrigeration and special storage facilities as well as for packaging and handling techniques that have been specifically developed for each particular crop.

The opportunities for trained personnel are numerous in all aspects of vegetable production and the closely related fields of purchasing, processing, merchandising, extension, and banking. Some students may continue their studies in graduate school in preparation for teaching, research, or cooperative extension work in colleges and universities or with private organizations. Recently there has been an increased interest in growing vegetables in tropical countries, and international agriculture, with a specialization in vegetable crops, provides excellent training for this vocation.

The different specialties within vegetable crops afford a very flexible curriculum. Courses are chosen by students in consultation with an adviser and other members of the staff. Students usually take most of the courses offered by the Department of Vegetable Crops and commonly choose other courses from accounting, agricultural geography, and marketing; soils, soil fertility, and regional agriculture; plant biology, physiology, ecology, and anatomy; oral expression; food science; nutritional sciences; plant pathology, or weed science. Students may also be interested in graduate work in plant pathology or some other area of biology.

A core of basic and applied courses is strongly suggested, including chemistry, mathematics, physics and biological sciences, plant breeding, and plant pathology. Course selection is advised by the student's adviser and other members of the staff. Individual students. The diverse pomology curriculum, complemented by courses in basic sciences and arts and electives in a student's area of interest, prepares pomology majors for a career in fruit production, agricultural business related to the fruit industry, storage and merchandising, or professional pomology. Job opportunities for graduates may be found in fruit production, marketing, sales and service, research, teaching, and extension.

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political economy, and research methodology. Students specialize in one of four areas described below.

Regardless of the area of specialization, all students learn the theory and methodology of sociology and how to apply both to research in their subject area.

Recognizing that students are concerned with future career opportunities, the undergraduate program emphasizes acquisition of skills as well as general knowledge in preparation for jobs or further study upon graduation. Accordingly, students are expected to become involved in the application of theory, methodology, and principles and concepts to analysis of practical problems.

Rural sociology offers degree programs at both the undergraduate and graduate levels (B.S., M.S., M.P.S., or Ph.D.). Those programs are offered through the Department of Rural Sociology, which maintains offices in Warren Hall. For many years, the department has been recognized as one of the top departments in the area, and it is known for its innovative program orientation. Faculty members in this department are committed to both quality instruction and research programs.

Being located in a college of agriculture, faculty members maintain strong ties with the technical fields in the college as well as with the International Agriculture Program, the Biology and Society Program, the Women in Development Program, the Center for International Studies, and the Cornell Institute for Social and Economic Research. Department members also maintain working relations with general sociology and many other social science units located in other colleges at Cornell. Students are encouraged to supplement their course work by electing courses in those other departments and programs, thereby rounding out their educations by acquiring different perspectives.

The undergraduate concentrations offered in rural sociology include sociology of agriculture and natural resources, rural and community development, international development, and social data and policy analysis. The various concentrations vary in terms of course requirements and credits needed for graduation.

All students majoring in rural sociology are expected to take an introductory course (101 or 102), one or more courses at the 200 level (205, 207, or 208) on selected topics, methods (213), theory (301), and a course in statistics.

The concentration in sociology of agriculture and natural resources provides an understanding of the biological, technological, political, and socioeconomic relationships that govern distribution, and control of natural resources, particularly in agricultural production. Agriculture represents a complex set of institutions around which natural resources, production, and social change can be investigated historically and contemporarily. Environmental sociology, the politics of land and water use, and the emerging biotechnologies represent other substantive foci around which a specialization can be structured. Students develop sophistication in the processes of social organization and change, where natural resources play a strategic role in economic production.

Students are encouraged to complement courses in the department with course work in history, economic change, and the policy sciences. Course selections in rural and community (regional) development, social data and policy analysis, and international development make appropriate complements.

Total credits required, including the five core courses: 45

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Soc 207, Problems in Agriculture and Natural Resources</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 324, Environment and Society</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 405, Agriculture, Society, and Biotechnology</td>
<td>3</td>
</tr>
</tbody>
</table>

Required Electives

At least 12 credits to be selected from a list of the complementary courses. Other courses may be substituted for these with the consent of the student's advisor.

The concentration in rural and community development provides an understanding of and training in (1) the analysis of social structures and processes for development in metropolitan settings, particularly in the United States; (2) the formulation of strategies for development in those settings; and (3) the implementation of development efforts in diverse communities. This specialization emphasizes the theory, methods, and applications of sociology as practiced in rural sectors of industrialized nations, with emphasis on the United States. Students are urged to choose electives that contribute to those three aspects of development in metropolitan settings. Those electives include courses found in departments such as Sociology, Human Service Studies, City and Regional Planning, and Agricultural Economics.

Total credits required, including the five core courses: 45–48

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>R Soc 206, Problems in Rural and Community Development</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 213, Social Indicators and Data Management</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 356, Rural Society in America</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 436, Small Communities: Structure and Change</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 435, Community Development</td>
<td>3</td>
</tr>
</tbody>
</table>

Electives (at least 4 courses and 12 credits)

Courses in this category may be any courses in the departments of Rural Sociology, Sociology, City and Regional Planning, and Human Service Studies that (1) fall in the 200–400 levels, and (2) have a large part of their content dealing with social analysis of phenomena occurring in the United States. Other courses may be substituted with the approval of the student's advisor.

Total credits required: 12

The concentration in international development sociology provides: (1) the understanding of the processes of socioeconomic development in low-income or Third World countries and (2) training in the formulation of strategies to enhance the socioeconomic well-being of citizens of those countries.

The emphasis is on acquiring a broad background in the processes of social change and development in advanced and less developed countries, particularly in rural areas. Students are urged to choose courses in development and social change and advanced courses in specific topics relevant to international development sociology, as well as electives in other disciplinary perspectives on international development (for example, agricultural economics, agronomy, and animal science).

Total credits required, including the five core courses: 39

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Soc 205, Rural Sociology and International Agrarian Problems</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 355, Rural Development and Cultural Change</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 357, Subsistence Agriculture in Transition</td>
<td>3</td>
</tr>
<tr>
<td>R Soc— Another course, yet to be designated</td>
<td>3</td>
</tr>
</tbody>
</table>

Required Electives (3 courses and 9 credits)

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>R Soc 356, Rural Society in America</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 405, Agriculture, Society, and Biotechnology</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 432, Community Development</td>
<td>3</td>
</tr>
<tr>
<td>R Soc 445, Rural Social Stratification</td>
<td>3</td>
</tr>
<tr>
<td>Soc 378, Economics, Population, and Development</td>
<td>4</td>
</tr>
<tr>
<td>Soc 404, Human Fertility in Developing Nations</td>
<td>4</td>
</tr>
<tr>
<td>Soc 439, Social and Demographic Changes in Southeast Asia</td>
<td>3</td>
</tr>
<tr>
<td>Comm 624, Communication in Developing Nations</td>
<td>3</td>
</tr>
</tbody>
</table>

The concentration in social data and policy analysis provides (1) an understanding of social, economic, political, and historical concepts and principles essential to conducting meaningful analysis of practical problems and issues faced by organizations, communities, regions, and states; (2) in-depth knowledge of research methodology, statistics, and computer applications; (3) knowledge and practice in policy analysis; and (4) procedures for conducting evaluation studies. In addition to acquiring this expertise, each student is expected to accrue substantive knowledge in some area of sociology of his or her choosing.

Students in the concentration are required to take a sequence of courses in rural sociology that will introduce them to the basic concepts and principles of sociology, research procedures, statistics, and sociological theory. However, this specialization places greater emphasis on the acquisition of research and policy analysis skills than the others. Accordingly, students will take more courses in research methods, policy analysis, and evaluation techniques. Although several of the courses in this sequence will involve statistics and use of computers for collection, tabulation, and interpretation of data, rigorous training in mathematics is not a prerequisite.

Total credits required, including the five core courses: 41–44

Required Courses

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Soc 201, Sociological Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or Soc 301, Evaluating Statistical Evidence</td>
<td>3</td>
</tr>
<tr>
<td>Soc 311, Primary Data Collection and Design</td>
<td>3</td>
</tr>
<tr>
<td>or HSS 292, Research Design and Analysis</td>
<td>3</td>
</tr>
<tr>
<td>or Comm 382, Survey Research Methods</td>
<td>3</td>
</tr>
<tr>
<td>Ag En 102, Introduction to Microcomputer Applications</td>
<td>3</td>
</tr>
<tr>
<td>or Ag En 304, Introduction to Computing</td>
<td>3</td>
</tr>
<tr>
<td>R Soc/Soc 426, Policy Research</td>
<td>3</td>
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</tbody>
</table>

Elective Courses

(11–12 credits)

<table>
<thead>
<tr>
<th>Courses Required</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ 102, Introductory Macroeconomics</td>
<td>3</td>
</tr>
<tr>
<td>or Ag Ec 150, Economics of Agricultural Geography</td>
<td>3</td>
</tr>
<tr>
<td>Soc 414, Population Policy</td>
<td>4</td>
</tr>
<tr>
<td>or Soc 430, Social Demography</td>
<td>4</td>
</tr>
<tr>
<td>Soc 431, Techniques of Demographic Analysis</td>
<td>4</td>
</tr>
<tr>
<td>Govt 426, Government and Public Policy</td>
<td>3</td>
</tr>
<tr>
<td>or HSS 450, Human Service Planning Methods</td>
<td>3</td>
</tr>
<tr>
<td>Phil 381, Philosophy of Science</td>
<td>4</td>
</tr>
</tbody>
</table>

Brochures are available from rural sociology faculty members.
Statistics and Biometry

Statistics is concerned with quantitative aspects of scientific investigation: design, measurement, and summarization, and the making of inferences. Biometry is the application of mathematical and statistical techniques to the life sciences. Students with ability in mathematics and an interest in its applications will find this a challenging specialization.

The work of a statistician or biometrician can encompass research, consulting, and computing in almost any mix and in a wide variety of applications. Opportunities for employment are abundant in universities, in government, and in businesses and industries ranging from large corporations to small consulting firms, and salaries are usually excellent.

While satisfying course requirements for a specialization in statistics and biometry, students can also take a wide variety of courses in other disciplines. In fact, students are encouraged to take courses in applied disciplines such as agriculture, biology, economics, and the social sciences that involve numerical data and their interpretation.

Students specializing in this area are required to take computer science courses (e.g., Computer Science 100 and 211), mathematics courses (at least three semesters of calculus), and statistics courses (Statistics and Biometry 200, 408-409, 416-417 601 -602 and 607 and Industrial and Labor Relations 310). Work experience gained through summer employment or undergraduate teaching is highly recommended. Students should contact Charles E. McCulloch for information.

Special Programs in Agriculture and Life Sciences

Some students are interested in pursuing a general education in the agricultural sciences. Others are uncertain about career objectives in agriculture and the life sciences. The opportunity to develop an independent major in general studies in agriculture and the life sciences is essential in this rapidly growing field. Students should plan basic course work in agronomic sciences, biological sciences, and social sciences. Many biotechnology concerns deal with aspects of agriculture, especially plants, crops, and ecosystems in the natural environment. A strong grounding in biological sciences as well as knowledge of the agricultural sciences is essential in this rapidly growing field. Students should plan basic course work in agronomic sciences, biological sciences, and social sciences. Advanced courses may be selected in those and other areas of individual interest or career aspiration.

Cooperative extension prepares students for careers in agricultural production, 4-H youth development, community action, and homes and grounds improvement. With the help of designated advisers, courses selected will meet requirements for (1)

- preparation in agricultural technology in a department of the college and (2) preparation in social sciences, communications, and program methodology. A limited number of cooperative extension agent positions are filled from each year's graduating class.

Students desiring to prepare for extension careers in commercial agriculture will complete a two-part requirement:

1) Each student must complete 15 credits or more in oral communication, written communication, psychology, and sociology, with at least one course in each area. Freshman seminars may not be used to fulfill the written communication requirement. It is strongly suggested that students also complete courses in education, particularly in curriculum development. Graduate seminars may not be taken.

2) Students choose one of the specializations listed below and work with their adviser to schedule their course work. Each student must complete the requirements for a specialization.

Specialization

- Animal science and dairy production
- Farm business management and finance
- Field crops and soil science
- Floriculture and ornamental horticulture
- Forestry
- Vegetable crops

Students who want to prepare for careers in 4-H program positions complete part 1, as outlined above, and are encouraged to concentrate on one or more areas of agricultural technology, but not necessarily at the level required for a specialization.

International agriculture provides students with an understanding of the special problems of applying basic knowledge to the processes of agricultural modernization in low-income countries. The student typically specializes in a particular subject and works with an adviser to plan a program oriented toward international agriculture. Graduate students in international agriculture are designed to acquaint students with the socioeconomic factors in agricultural development, with the physical and biological nature of tropical crops and animals, and with various world areas for which study programs exist. The study of a foreign language is required.

In addition to the college distribution requirement, students majoring in international agriculture must take a minimum of 30 credits. A minimum of 7 credits in international agriculture and 8 credits in a modern foreign language are required. The other courses recommended are drawn from a wide range of disciplines. The objective is to acquaint students with the many facets of agricultural development in low-income countries. Students are encouraged to take additional specialized courses in one of the other program areas of the college.

Description of Courses

Undergraduate and graduate courses in the college are offered through the seventeen academic departments and also through the Divisions of Biological Sciences and Nutritional Sciences. Descriptions of courses, both undergraduate and graduate, are given by department, arranged in alphabetical order.

Graduate study is organized under graduate fields, which generally coincide with the departments. Graduate degree requirements are described in the Announcement of the Graduate School. Courses for graduate study are described in the section on the academic department that offers them.

Nondepartmental Courses

ALS 100 American Indian Studies: An Introduction Fall. 3 credits.

ALS 127-128 Introduction to Farm Techniques 127 fall; 128, spring. 1 credit each semester. Prerequisite: permission of instructor. S-U grades only. Contact P. Deeb, 292 Roberts, for scheduling. Limited to 8 students per section.

ALS 127-128 Introduction to Farm Techniques T or W. 1:25–4:30. Class assemblies in front of 192 Roberts Hall for transport to various facilities.

ALS 318 Ethnobiology of the Northern Iroquois (also Anthropology 318) Spring. 3 or 4 credits. TR 2:30–3:45. S. Saraydar.

ALS 400 Internship Fall, spring, or summer. 6 credits maximum. Not open to students who have earned internship credits elsewhere or in previous terms. S-U grades only.

ALS 400 Internship Fall, spring, or summer. 6 credits maximum. Not open to students who have earned internship credits elsewhere or in previous terms. S-U grades only. Students may register only for internships approved by the College Internship Committee. Currently, the opportunities are available in the New York State Assembly Intern Program, the New York State Senate Session Assistant's Program, and the Albany Semester Program. A learning contract is negotiated between the student and the faculty supervisor, stating conditions of the work assignment, supervision, and reporting. Participation is required in any structured learning activities associated with the internship.

Related Courses in Other Departments

History of the Agricultural Sciences (History 443)

Agricultural Economics


Agricultural Economics 37
160. Economics of Agricultural Geography Fall. 3 credits. Lecs. MWF 11:05 or 12:20. 2 evening prelims. D. G. Sisler. The economics and geography of world agriculture, providing a basis for understanding past development and future changes. Elementary economic principles, historical development, physical geography, and population growth are studied in their relation to agricultural development and the economic problems of farmers. Where possible, current domestic and foreign agricultural issues are used to illustrate principles.

220 Introduction to Business Management Fall. 3 credits. Lecs. MWF 10:10 or 11:15; disc. M 2:30–4:25 or 7:30–9:25 p.m. (2 secs); T 8–9:55, 10:10–12:05, 12:20–2:15, 1:2–2:55, or 2:30–4:25; W 8–9:55, 10:10–12:05, 12:30–2:45, 7:30–9:25 p.m. (2 secs); R 8–9:55 or 2:30–4:25. In weeks when discs are held, there will be no W lecture. Discs are held instead of a lecture in all but four weeks of the term. 2 evening prelims. Staff. Principles and tools useful in performing four major functions of management: planning, organizing, directing and leading, and controlling. Within this framework, consideration is given to social, legal, and environmental concerns, forms of business ownership; financial statements; cost behavior, and a few key concepts and tools in financial management.

221 Financial Accounting Spring. 3 credits. Not open to freshmen. Lecs. MWF 10:10 or 11:15; lab, T 8–9:55, 10:10–12:05 (2 secs), 12:20–2:15, or 2:30–4:25; W 8–9:55, 10:10–12:05 (2 secs), 12:20–2:15 (3 secs), 2:30–4:25 (2 secs), or 7–9 p.m. (3 secs); R 8–9:55, 10:10–12:05, 12:20–2:15, or 2:30–4:25. 2 evening prelims and a comprehensive final. M. Hubbert. A comprehensive introduction to financial accounting: concepts and techniques, intended to provide a basic understanding of the accounting cycle and the elements of financial statement analysis and interpretation.

240 Marketing Spring. 3 credits. Not open to freshmen. Lecs. MWF 11:15; lab, M 2:30–4:25, T 12:20–2:15 or 2:30–4:25; W 2:30–4:25; R 2:30–4:25; F 10:10–12:05. In weeks labs are held, there will be no F lecture. G. A. German. An introductory study of the food marketing system and the interaction of the goals and practices of producers and marketers (in such areas as buying and selling, grading, transporting, packaging, and advertising), price-making institutions (such as commodity futures markets), the behavior and purchasing practices of consumers, and the interrelationships among those groups.

302 Farm Business Management Spring. 4 credits. Not open to freshmen. Lecs. MWF 10:10; lab, T WF or R 1:25–4:25. On days farms are visited, the lab period is 1:25–5:30. W. A. Knoblauch. An intensive study of problems associated with planning, organizing, operating, and managing a farm business, with emphasis on the tools of managerial analysis and decision making. Topics include management information systems, business analysis, budgeting, and acquisition, organization, and management of capital, labor, land, and machinery.

310 Introductory Statistics Fall. 4 credits. Prerequisite: Education 15 or equivalent level of algebra. Lecs. MWF 12:20; lab, M 2:30–4:25 (2 secs); T 9:05–11, or 2:30–4:25 (2 secs); W 9:05–11, or 2:30–4:25 (2 secs); R 9:05–11, or 2:30–4:25 (2 secs); F 9:05–11. Students who feel somewhat uncomfortable with basic statistical terminology should try to sign up for lab M 2:30–4:25, T 9:05–11 or 2:30–4:25, or W 9:05–11. Evening exams. L. Gosses. An introduction to statistical methods. Topics to be covered include the descriptive analysis of data, probability concepts and distributions, estimation and hypothesis testing, regression, correlation and time series analysis using statistical methods. Applications from business, economics, and the biological sciences are used to illustrate the methods covered in the course.

320 Business Law Fall. 3 credits. Limited to juniors, seniors, and graduate students. Lecs. MWF 9:05. 1 evening prelim. D. A. Goss. Consideration is given chiefly to legal problems of particular interest to persons who expect to engage in business. Emphasis is on the law pertaining to personal property contracts, agency, real property, and the landlord-tenant relationship.

[321 Law of Business Associations Spring. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisite: Agricultural Economics 320 or permission of instructor. 321 and 420 may be taken concurrently. Not offered 1987–88. Lec. T 2:30–4:30. 1 evening prelim. J. B. Buglian. The first portion of this course examines the formation and operation of business enterprises, particularly partnerships and corporations. The second portion of the course will review government regulations and control of business activity. Special attention will be given to the antitrust laws, consumer protection legislation, and environmental protection legislation.]

322 Taxation in Business and Personal Decision Making Spring. 3 credits. Recommended. Background in accounting and business law. Lecs. MWF 2:30; disc to be arranged. 2 evening prelims. M. Hubbert. The impact of taxation, both state and federal, on business and personal decision making. After a brief discussion of tax policy, an in-depth examination is conducted of federal income, estate, and gift taxes affecting individuals and business entities. Both tax management and tax reporting are stressed.

323 Managerial Accounting Fall. 3 credits. Prerequisite: Agricultural Economics 221 or equivalent. Lecs. MWF 12:20 or 1:25; disc. R 8–9:55, 10:10–12:05, 12:20–2:15, or 2:30–4:25; F 10:10–12:05. 2 evening prelims and a comprehensive final. M. Hubbert. An introduction to cost accounting that emphasizes the application of accounting concepts to managerial decision making. Major topics include basic costing, standard costing, cost behavior, cost allocation, pricing, budgeting, inventory control, variance analysis, measuring divisional performance, accounting for inflation, and accounting in the manufacturing environment.

324 Financial Management Spring. 4 credits. Prerequisites: Agricultural Economics 220 or equivalent. Recommended: Agricultural Economics 221 and 310 or equivalents. Lecs. MWF 9:05; dis. W 2:30–4:25 or R 9:05–11, 12:20–2:15, or 2:30–4:25; F 10:10–12:05 or 12:20–2:15. 2 evening prelims. L. B. Anderson. Focuses on three major questions facing management: how to evaluate capital investment decisions, how to raise the capital to finance those investments, and how to generate sufficient cash flows to meet the firm’s cash obligations. Major topics include methods to analyze capital decisions, impact of taxes, techniques for handling risk and uncertainty, effects of inflation, sources and costs of debt and equity capital structure, leverage, and working capital management. Microcomputers are used for analyzing financial problems. No previous computer experience is required.

325 Economics of the Public Sector Spring. 3 credits. Prerequisite: Economics 101 or equivalent. Lecs. MWF 1:25 or 2:30. 2 evening prelims. M. Hubbert. The application of economic concepts to evaluation of the structure and performance of the public sectors of the economy. Emphasis on microeconomic analysis of public finance and public resource allocation. Principal topics: market failure, articulation of public choice and interests, evaluation of public decisions, and current public policy.

342 Marketing Management Fall. 3 credits. Limited to ALS majors. Prerequisites: Agricultural Economics 240 and Economics 101–102. Lecs. MWF 10:10; disc. R 2:20–2:5 or 2:30–4:25. F 8–9:55, 10:10–12:05, or 12:20–2:15. In weeks discs are held, there is no F lecture. G. J. Conneman. Deals with principles and practices in the firm’s management of the marketing function. Emphasizes the revenue aspects of marketing by considering sales forecasting and strategies in product and brand selection, pricing, promotion, and channel selection. Identification and generation of economic data necessary for marketing decisions are considered.


[347 Marketing Fruits, Vegetables, and Floriculture Products Fall. 3 credits. Prerequisite: Agricultural Economics 240 or equivalent. Not offered 1987–88. TR 8:30–9:55. All-day field trip in the last S in September. Staff. A study of markets, marketing channels, and marketing services for fruits, vegetables, and floricultural commodities. An evaluation of marketing alternatives facing growers, shippers, wholesalers, and retailers of horticultural products. The role of public agencies in market information and regulation. The potential for group action to improve marketing operations.]

380 Independent Honors Research in Social Science Fall or spring. 1–6 credits. Limited to students who have met the requirements for the honors program. A maximum of 6 credits may be earned in the honors program.

402 Advanced Farm Business Management Spring. 3 credits. Prerequisite: Agricultural Economics 302 or equivalent. Lecs. MWF 9:05; dis. W 1:25–3:20. J. L. Culler. Emphasis is on evaluating the profitability of alternative investments and enterprises. Principal topics include the effects of income taxes on investment decisions, capital investment analysis, linear programming, and financial risk and uncertainty. Experience in computer applications to farm business management is provided. Previous computer experience is not required.

405 Farm Finance Fall. 4 credits. Prerequisites: Agricultural Economics 302 or equivalent. Lecs. TR 11:15, W 1:25; disc. W 2:30–3:20. E. L. LaDue. The principles and practices used in financing farm businesses, from the perspectives of the farmer and the farm lender. Topics include sources of capital, financing entry into agriculture, financial analysis of a business, capital management, financial statements, credit instruments, loan analysis, financial risk, and leasing.

406 Farm and Rural Real Estate Appraisal Spring, weeks 7–15. 2 credits. Limited to 45 students. Prerequisites: Agricultural Economics 302 or equivalent and permission of instructor. Lecs. R 11:15; lab, R 12:20–1:30. 5 half-day field trips. 1 all-day field trip. G. J. Conneman. The basic concepts and principles involved in appraisal. Factors governing the price of farms and rural real estate and methods of valuation studied. Practice in appraising farms and other rural properties.
407 Advanced Agricultural Finance Seminar
Spring. 2 credits. Limited to 16 seniors with extensive course work in farm management and farm finance. Open by application prior to March 1 of the year before the course is offered.
W 3:35–5:30. E. L. LaDue.
A special program in agricultural finance, conducted with financial support from the Farm Credit System. Includes two days at Farm Credit Banks of Springfield, one week in Farm Credit Association offices, an all-day field trip observing farm financing during fall term, a four-day trip to financial institutions in New York City during intersession, and lecture-discussions in the spring term. Representatives from banking, agricultural finance, and similar areas participate in spring-term lecture-discussion sessions.

408 Seminar in Farm Business Decision Making
Fall (1 week in intersession). 3 credits. Prerequisite: Agricultural Economics 302 and 405 or equivalent, and permission of instructor.
Develops students' ability to recognize, comprehend, and communicate the factors relevant to farm financial decisions. Two field trips and intensive work with a farm family.

409 Farm Management Workshop
Fall. 1 credit. Limited to seniors majoring in agriculture.
T 12:20–2. B. F. Stanton and staff.
Presentation and interpretation of research in farm management and production economics. Participants conduct seminars reporting on research methodology and results obtained. Students prepare a summary and evaluation of a recent research publication during the semester.

411 Financial Markets and Policies
Spring, weeks 1–9. 2 credits. Limited to CALS majors. Prerequisite: Agricultural Economics 405.
Financial markets and policies affecting financial aspects of agriculture and farmers. How money and capital markets affect credit cost and availability in agriculture. Insurance and investment concepts relevant to farming operations. Financial considerations in starting a farm.

412 Introduction to Linear Programming
Spring. 3 credits. Primarily for juniors, seniors, and M.S. degree candidates. Prerequisite: Agricultural Economics 310 or equivalent.
H. M. Kaiser.
An introduction to the concepts and computational procedures of linear programming. Emphasis on interpretation of results, model building, and data requirements for estimation using standard computer programs. Topics include sensitivity analysis, parametric programming, the transportation problem, scheduling, and distribution. Primary applications are made to agribusiness and analysis using microcomputer software and mainframe packages.

415 Agricultural Prices
Spring. 3 credits. Prerequisite: Agricultural Economics 302 or equivalent. lecs., M W F 9:05. L. S. Willett.
An analysis of supply and demand characteristics of farm commodities, institutional aspects of pricing farm and food products, temporal and spatial price relationships, price forecasting, and the economic consequences of pricing decisions.

416 Introduction to Econometrics
Spring. 3 credits. Prerequisite: Agricultural Economics 310 or equivalent. Recommended: Agricultural Economics 415.
The course introduces students to basic econometric principles and the procedures used in empirical studies of demand, supply, and price behavior.

418 Information Systems and Decision Analysis
Spring. 3 credits. Prerequisites: Agricultural Engineering 102 or equivalent, Economics 101 or equivalent, and Agricultural Economics 310.
The focus of the course is on management decision making and the support provided by management information systems. The student will learn the behavioral assumptions made in economics about decision making and the decision rules that result. Techniques for implementing the decision rules will be introduced (decision trees, network analysis, transition diagrams, sensitivity analysis), as well as the statistical techniques (simulation, forecasting) used to produce the information necessary to the decision process. The topics will be discussed in a variety of decision settings (inventory, congestion, planning and scheduling).

420 Advanced Business Law
Spring. 3 credits. Limited to seniors, juniors, and graduate students. Not offered 1987–88.
Lecs., T R 8:30–9:55. One evening prelim.
J. B. Bugliari.
Designed to provide a fairly detailed and comprehensive legal background in areas of commercial law affecting the operation of business enterprises. Particular consideration given to the law pertaining to bailments, sales, secured transactions, bankruptcy, and commercial paper.

422 Estate Planning
Fall. 1 credit. Limited to upperclass students. S-U grades only. Not offered 1987–88.
Lecs., M 4. J. B. Bugliari.
Fourteen sessions on the various aspects of estate-planning techniques. The law and use of trusts, the law of wills, federal and New York State estate and gift taxes, and probate procedures are covered.

424 Business Policy
Spring. 3 credits. Limited to seniors majoring in business management and marketing.
An integrating course that examines business policy formulation and implementation from the standpoint of the general manager of an organization, focusing on decision making at the top management level. The course is built around a series of cases. Several guest executives. Emphasizes improving oral and written communication skills.

426 Cooperative Management
Fall. 3 credits. Recommended: Agricultural Economics 220 or equivalent.
Investigates the unique aspects of cooperative business organizations. Topics are approached from the points of view of management, the board of directors, and members, and include: cooperative principles, management decision making, legislation, financing, taxation, and marketing problems cooperatives attempt to handle. Primary focus is on the microeconomic foundations in resource economics and the policy implications for resource management.

431 Farm and Food Policies
Fall. 3 credits. S-U grades optional.
Lecs., T R 9:05; disc., R 11:15 or 1:25, or F 10:10. B. F. Stanton.
The course deals broadly with farm and food policies, including price support and storage or reserve policies, agricultural protection, soil conservation programs, the structure of agriculture, and domestic food subsidy programs. The importance of international trade and agricultural policies in other countries is emphasized.

441 Personal Enterprise and Small Business Management
Spring. 3 credits. Limited to juniors and seniors.
Lecs., M W 11:15–12:45 or 2:30–4:00. Staff.
Designed to acquaint students with the role of small businesses in the American economy. Special emphasis on the problems related to starting a new business, including financing strategic planning, staffing, marketing, and managing growth. The term project will be group development of a business plan. Visiting entrepreneurs will illustrate a variety of business formats.

443 Food Industry Management
Spring. 4 credits. Limited to juniors and seniors.
G. A. German.
The course approaches food industry management, marketing, and management decision making with the goal of preparing students for management positions in the food industry. Emphasis is placed on the microeconomic foundations in food industry management, marketing, and decision making. Cases covering new product introductions, merchandising strategies, and investment decisions are used. Guest speakers from the food industry present case-study solutions at the Thursday session.

448 Food Merchandising
Fall. 3 credits. Limited to juniors and seniors. Prerequisite: Agricultural Economics 240.
Merchandising principles and practices as they apply to food industry situations. The various elements of merchandising are examined, including buying, pricing, advertising, promotion, display, store layout, profit planning, and control, and merchandising strategies. The consequences of food industry trends and initiatives for other industry members, public policymakers, and consumers are considered.

449 Applications in Strategic Marketing
Fall. 2 credits. Prerequisites: Agricultural Economics 342 or permission of instructor. Cost of field trips, about $250.
W 2:30–4. Two 1-day field trips to the upstate area and a 3-day trip to the New York City area during intersession, just prior to registration (Jan. 17–20, 1988). E. W. McLaughlin.
Focuses on the major components of strategic marketing: product mix, distribution, pricing, advertising, and promotion, and market research. Students are given firsthand exposure to a wide range of marketing strategies through field trips, guest lectures, case studies, a simulated marketing exercise, and development of a strategic marketing plan.

452 Resource Economics
Fall. 3 credits. Prerequisites: Mathematics 111 and Economics 311.
This course develops economic models for renewable resources, exhaustible resources, and environmental quality. Applications to fisheries, forestry, oil and gas, and air and water pollution are presented. Emphasis is on the microeconomic foundations in resource economics and the policy implications for resource management.

455 Agricultural Law
Spring. 3 credits. Limited to juniors, seniors, and graduate students. Prerequisites: Agricultural Economics 302 and 309 or equivalents, or permission of instructor.
Law and government regulations that apply to agriculture and the use of land for agricultural production. An overview of legal issues in installment sales and financing, farm leases, warehousing, cooperatives, employment, soil and water management, farm lands preservation and use, and ownership of animals.

464 Economics of Agricultural Development
Spring. 4 credits. Prerequisites: Agricultural Economics 150, Economics 101–102, or permission of instructor.
Hours to be arranged. Staff.
An examination of the processes of agricultural development in Third World nations and their interactions with United States policy. Agricultural and rural development policy, the interdependence of agriculture with other sectors, alternative forms of agricultural policies, food security, and related policies tending to alleviate highly concentrated income distributions are all emphasized.

499 Undergraduate Research Fall or spring. 1–4 credits. Limited to seniors with grade-point averages of at least 2.7. Prerequisite: written permission of the staff member who will supervise the work and assign the grade; this permission must be attached to course enrollment material. S-U grades optional. Permits outstanding undergraduates to carry out independent study of suitable problems under appropriate supervision.

[605 Agricultural Finance and Capital Management Fall. 3 credits. Prerequisites: Agricultural Economics 402 or 405, or equivalent. Offered alternate years. Not offered 1987–88. $25 charge for reading material, no text.
Lec, T R 8:40–9:55. J. Brake, L. Tauer, E. LaDue. Advanced topics in capital management and financing of agriculture. Special emphasis on current issues. Example topics: farm-sector funds flows, financial risk and decision-making, farm financial policy, financial intermediation and intermediaries, firm growth, inflation, investment-replacement models, and selected topics on financing agriculture in developing countries.]

608 Production Economics Fall. 3 credits. Prerequisite: Economics 311 or equivalent. Recommended: Mathematics 111 or equivalent.
Lecs, M W F 10:10. L. W. Tauer. The theory of production economics with emphasis on applications to agriculture. Topics include the derivation, estimation, and use of production, cost, profit, demand, and supply functions. Production response over time and under risk is introduced.

630 Policy Analysis I: Welfare Theory, Agriculture, and Trade Spring. 4 credits. Prerequisites: Agricultural Economics 608 or Consumer Economics 603, Economics 313, or equivalent intermediate micro theory incorporating calculus.
Lecs, T R 8–9:55. C. Ramey, D. Lee. The first half of the course surveys the theory of welfare economics as a foundation for public policy analysis. Major topics include the production of social welfare, the measurement of social welfare, the choice of welfare criteria, and the choice of market or nonmarket allocation. Basic concepts covered include measurement of welfare change, including the compensation principle, consumer and producer surplus, willingness-to-pay measures, externalities, and the general theory of second-best optimum. The second half of the course focuses on public policy analysis as applied to domestic agricultural policy and international trade. The domestic policy component examines major U.S. farm commodity programs and related food and macroeconomic policies and analyzes their effects on producers, consumers and other groups. The international trade component examines the structure of world agricultural trade, analytical concepts of trade policy analysis, and the principal trade policies employed by countries in international markets.

631 Policy Analysis II: Resources and Agricultural Development Fall. 4 credits. Prerequisite: Agricultural Economics 630.
Lecs, T R 8–9:55. D. Chapman, D. Blandford. The first half of this course covers issues related to natural resources. Beginning with an overview of benefit-cost analysis and project evaluation, the course continues by considering global and transnational resource topics including common property and externalities issues related to the distribution, resource base, and depletion of economically significant resources are examined. Microcomputer simulation assists in integrating quantitative aspects of policy analysis. The second half of the semester focuses on the analysis of policies for agricultural growth and development. Theories of growth and agriculture’s role in the development process are discussed. Macroeconomic and sectoral policies affecting production, consumption, and trade are evaluated.

640 Analysis of Agricultural Markets Fall. weeks 1–7. 2 credits. Prerequisites: Agricultural Economics 415 and 416 or equivalents.
Lecs, T R 12:20–2:15. O. D. Forker. This course is about markets for agricultural products: their institutional characteristics, criteria for evaluating performance, models of price determination, farm-retail marketing margins, marketing in underdeveloped countries, and selected public-policy issues related to market performance. Agricultural Economics 641, 740, and 741 cover additional dimensions of agricultural markets.

641 Commodity Futures Markets Fall. weeks 8–14. 2 credits. Prerequisites: Agricultural Economics 415 and 416 or equivalents. Recommended: Agricultural Economics 640.
Lecs, T R 12:20–2:15. W. G. Tomek. This course is primarily about markets for agricultural futures contracts. Emphasis is placed on price behavior on cash and futures markets and the relationships among prices. These principles provide a foundation for an examination of hedging, speculation, and public-policy issues.

643 Export Marketing Fall. 3 credits. Prerequisite: graduate or upperclass standing. Estimated cost of field trip, $25.
Lec, R 2:30–4:45. Overnight field trip to New York City required. W. H. Lesser. An exploration of the processes and procedures for export marketing. Emphasis is placed on financing arrangements and on alternative risk-reducing strategies. Organization for export marketing is discussed along with government export-promotion programs. This course is intended to provide practical information on the process of marketing overseas. Students participate in a custom-developed, competitive export-trading simulation.

651 Economics of Resource Use Fall. 4 credits. Economics 509 or Agricultural Economics 450 recommended.

652 Special Problems in Land Economics Fall or spring. 1 or more credits. Limited to graduate students. Prerequisite: permission of instructor. S-U grades optional.

660 Food, Population, and Employment Fall. 4 credits. Enrollment limited to 15 to ensure that students have an opportunity to work individually with the instructor.
Lec, T 2:30–4:30. M. W. P. Lee. An individual weekly meeting with the instructor T. T. Poleman. Examine the links between employment, food, and population growth in less-developed countries. Food economics and the characteristics of food-situation are treated as cornerstone and examined in historical perspective. Requires a major term paper.

663 Macroeconomic Issues in Agricultural Development Fall. 3 credits. Prerequisite: permission of instructor. S-U grades optional. Offered alternate years.
Lec to be arranged. E. Thorbecke.

Issues such as the role of agriculture in economic development, the household farm as a producing and consuming unit, operation of product and factor markets in agricultural and rural areas, structural transformation of agriculture in the process of economic development, policy of agricultural development, and agricultural and rural development strategies and models. The approach followed is theoretical, quantitative, and empirical.

664 Microeconomic Issues in Agricultural Development Spring. 3 credits. Prerequisite: Agricultural Economics 608, Economics 311, or permission of instructor. S-U grades optional.
Lec, T R 11:15–12:30. R. Barker. Issues such as production efficiency, induced technological change, allocation of research resources, and the distribution of income from new technology are discussed. The theoretical argument is related to applied research problems.

[665 Seminar on Latin American Agricultural Policy Fall. 3 credits. Prerequisite: Agricultural Economics 464 or work in Latin American economic and social development. Offered alternate years. Not offered 1987–88. Hours to be arranged. Staff.
An examination of policies for the development of the agricultural sector in Latin America, including an identification of policy objectives and a review of the instruments of public policy implementation. Particular attention is paid to the interactions of agrarian structure, agricultural productivity, and rural welfare.]

699 M.P.S. Research 1–6 credits. Prerequisite: registration as an M.P.S. student. Credit is granted for the M.P.S. project report.

700 Topics in Agricultural Economics Fall or spring. Limited to graduate students. Credit, class hours, and other details arranged with a faculty member.
The course is used to offer special topics in agricultural economics that are not covered in regular class offerings. More than one topic may be given each semester in different sections. The student must register in the section appropriate to the topic being covered; the section number is provided by the instructor.

[708 Advanced Production Economics Fall. 3 credits. Prerequisites: Agricultural Economics 608, 710, or equivalents; Economics 509 is highly recommended. Offered alternate years. Not offered 1987–88. Hours to be arranged. R. N. Boisvert.
Theoretical and mathematical developments in production economics, with emphasis on estimating partial and production functions, scale economies, technical change, factor substitution, and recently developed functional forms. Discussions of several other selected topics such as risk, supply response, and household production functions change from year to year based on student interest.]

710 Econometrics I Spring. 4 credits. Prerequisite: Enough preparation in matrix algebra and statistics (e.g., Statistics 417 and 601) to read J. Johnston, Econometric Methods, 3rd edition, chapters 5ff.
Lecs, T R 2:30–4:25. W. G. Tomek. This course provides an intermediate-level treatment of the specification, identification, estimation, and evaluation of econometric models. Common econometric problems are treated, including collinearity, specification error, autocorrelated disturbances, and other problems. Students seeking an introduction to econometrics should take Agricultural Economics 416.

711 Econometrics II Fall. 4 credits. Prerequisite: Agricultural Economics 710 or equivalent. Statistics 417 recommended.
Coverage beyond that of Agricultural Economics 710 of generalized least squares, testing linear hypotheses, the effects of specification error, and regression diagnostics. Applications include seemingly unrelated regressions, estimation with pooled data, models with stochastic coefficients, models with limited dependent variables, and distributed lag models.

712 Quantitative Methods I Fall. 4 credits. Prerequisite: Some formal training in matrix algebra. A course at the level of Statistics 417 is highly recommended.

Lecs, M W F 11: 5 R. N. Boisvert. A comprehensive treatment of linear programming and its extensions, including postoptimality analysis, goal programming, and the transportation model. Special topics in nonlinear programming, including separable, spatial equilibrium and risk programming models. Input-output models are discussed when time permits. Applications are made to agricultural, resource, and regional economic problems.

713 Quantitative Methods II Spring. 4 credits. Prerequisites: Economics 509 and Agricultural Economics 710.

Lecs, M W F 9:05; disc, F 2:30–3:20. J. M. Conrad, T. D. Mount. This course is concerned with the analysis and optimization of dynamic systems. Course objectives are to (1) present the basic theory of dynamical systems and dynamic optimization, (2) introduce associated methods of numerical and economic analysis, (3) review some applications of dynamic analysis from various subfields in economics, and thereby (4) equip students with basic theory and methods to perform applied research on dynamic allocation problems.

717 Research Methods in Agricultural Economics Spring. 2 credits. Limited to graduate students. M 1:25–3:20. B. F. Stanton, D. G. Sisler. Discussion of the research process and scientific method as applied in agricultural economics. Topics include professional responsibility, research design, sources of data, sampling concepts and designs, methods of collecting data, questionnaire design and testing, field organization, and analysis of data. During the semester each student develops a research proposal that may be associated with his or her thesis.

730 Seminar on Agricultural Trade Policy Spring. 3 credits. Limited to graduate students. Prerequisites: Agricultural Economics 630/631 and basic familiarity with quantitative methods.

F 1:25–4: D. Blandford, D. G. Sisler. A discussion of selected topics in agricultural trade policy, such as the linkage between domestic and international agricultural and trade policies, instability and market stabilization, and agricultural trade and development. The preparation of a term paper is an important part of the course.

740 Agricultural Markets and Public Policy Spring. weeks 1–7. 2 credits. Limited to graduate students. Prerequisite: familiarity with multiple regression techniques at the Agricultural Economics 416 level or higher. Recommended: Agricultural Economics 640.

T R 12:20–2: W. H. Lessar. Develops the concepts and methodology for applying and analyzing the effects of public-policy directives on the improvement of performance in the United States food marketing system. Topics include a survey of industrial organization principles, antitrust and other legal controls, and coordination systems in agriculture.

741 Methods of Trade and Commodity Policy Analysis Spring. weeks 8–14. 2 credits. Limited to graduate students. Prerequisite: familiarity with multiple regression techniques on the level of Statistics and Biometry 601. Recommended: Agricultural Economics 640.


The nature, use, and usefulness of alternative quantitative methods of trade and commodity policy analysis. Principal topics are the analysis of export supply—import demand for a single country, international commodity models, and macroeconomic or general equilibrium models of commodity trade.

750 Economics of Renewable Resources Spring. 4 credits. Prerequisite: Economics 509 and 518, or Agricultural Economics 713.

T R 2:30–4:25. J. M. Conrad. This course is concerned with the optimal allocation of renewable resources. Bioeconomic models of fishing and forestry are presented along with models of groundwater and surface water management. Theory applications and management policy are considered.

751 Seminar on Agricultural Policy Spring. 2 credits. Limited to graduate students. Offered alternate years. W 1:25–3:20. Staff. A review of the professional literature relating to agricultural policy issues and techniques appropriate to the analysis of such issues.


102 Introduction to Microcomputer Applications (also Computer Science 102) Fall. 3 credits. Each lab section limited to 16 students. Not open to students enrolled in the College of Engineering or to students who have taken any prior computer courses at Cornell. Students in Statutory Colleges must enroll in Agricultural Engineering 102.

Lecs, T R 12:20; lab, M 1:25–4:25 or T 7:30–10:30 p.m., T 8:15–11 or T 1:25–4:25, W 1:25–4:25 or 7:30–10:30 p.m., or R 7:30–1:25. 2 evening prelims. P. E. Hillman and computer science staff.

An introduction to the use of application packages on microcomputers. An attempt will be made to assess and demonstrate the current generation of personal computers through software for word processing, spreadsheets, database, and other applications. The course will involve very little programming using high-level languages.

110 Farm Metal Work Spring. 2 credits. Lecs, R 9:05; labs, (fall) M 1:25–4:25, (spring) M 1:25–4:25 or R 1:25–4:25. C. J. Cooky. Mlab, limited to 24 students, instruction includes in the fundamentals of metal lathe work and arc and oxyacetylene welding. T and R labs, each limited to 20 students, includes instruction in sheet metal work, pipe fitting, hot and cold metal work, and arc and acetylene welding.

132 Farm Carpentry Fall. 2 credits. Each lab limited to 15 students.


Instruction in the fundamentals of farm carpentry, including concrete work, and equipment and buildings constructed of wood. Each student is required to plan and construct an approved carpentry project.

151 Introduction to Computing in Agricultural Engineering Fall. 2 credits. Prerequisite: one term of calculus for concurrent registration in a calculus course.


This course provides an introduction to computing using IBM/PC/XT microcomputers. The structured programming language Pascal will be covered among agricultural engineering and related topics.

152 Computing with Graphics Spring. 2 credits. Prerequisite: Agricultural Engineering 151.


153 Engineering Drawing Fall. 2 credits. Limited to 30 students (15 in each lab).

Lecs, M 9:05; lab, T or W 1:25–4:25. H. A. Longhouse.

Designed to promote an understanding of engineering's universal graphic language. The lectures and laboratories develop working knowledge of drawing conventions, drafting techniques, and their application to machine and pictorial drawing problems. The course will involve both instrument and AutoCAD computer drawings.

200 Undergraduate Seminar Spring. 1 credit. S-U grades optional.

Lec, M 2:30. G. E. Rehkugler. A forum to discuss the contemporary and future role of agricultural engineering in society. A series of lectures will be given by practicing agricultural engineers, Cornell faculty members, and students. Written critiques are required. Students may take the seminar more than once but are limited to 2 credits maximum.

204 Introduction to Computer Uses Spring. 4 credits. Each lab section limited to 20 students. S-U grades optional.


An introductory course in computing for those interested in using microcomputers to handle data. Topics include preparing and processing computer programs in Pascal and FORTRAN. No prior knowledge of computers or computer languages is necessary.

209 Application of Physical Sciences Spring. 4 credits. Prerequisite: one term each of calculus and college physics.

Lecs, M W F 11:15; rec, 1 hour per week to be arranged. D. C. Ludington.

Explores several aspects of the physical world, including the flow of fluids and heat, some of the cycles for changing energy forms, thermodynamics of mixtures of air and water vapor, stress and strains in structures, and alternating current electricity.

221 Plane Surveying Fall. 3 credits. S-U grades optional.


Principles and practice of measurement of distance, elevation, and direction. Use and care of equipment is stressed during field problems related to mapping, engineering design, and construction. Other topics include surveying techniques, error analysis, and standards of accuracy.
Agriculture and Life Sciences

250 Engineering Applications in Biological Systems  Spring. 3 credits. Prerequisite: enrollment in an engineering curriculum. Recommended for the sophomore year. 
Case studies of engineering problems in agricultural and biological systems, including animal and crop production, environmental control, energy, and food engineering. Emphasis is on the application of mathematics, physics, the engineering sciences, and biology to energy and mass balances in agricultural systems.

301 Introduction to Energy Technology  Fall. 3 credits. Prerequisite: high school or college physics or Agricultural Engineering 209. S-U grades optional. Offered alternate years. Offered fall 1987. 
Lec, M W F 10:10. L. D. Albright. 
Basic concepts of energy transfer and traditional and alternative sources of energy. Design of small systems and appropriate technology are emphasized. Topics include heating, cooling, solar energy, electricity, hydropower, wind power, biogas production, and energy economics.

310 Advanced Farm Metal Work  Spring. 1 credit (2-credit option available). Prerequisite: Agricultural Engineering 110, permission of instructor. 
Lab F 1:25–4:25. (second lab must be arranged for 2-credit option) T. J. Cook. 
Advanced welding and metal construction project. 

311 Farm Machinery  Fall. 3 credits. Each lab limited to 16 students. Prerequisite: high school physics or equivalent. 
A study of the operating principles, use, selection, and components. 

312 Engines and Tractors for Agricultural Applications  Spring. 3 credits. Each lab limited to 16 students. Students missing the first week of classes without permission of the instructor are dropped so others may register. Prerequisite: high school physics or equivalent. 
Lecs, T R 11:15; lab, M T or W 1:25–4:25. Staff. 
A study of the principles of operation, adjustment, and maintenance of internal combustion engines and tractors. Topics include engine cycles, fuels, lubricants, carburetion, fuel injection systems, ignition, charging, circuits, valve conditioning, engine testing, transmissions, traction, and human factors in tractor operation.

315 Electricity: Its Use and Control  Spring. 3 credits. Prerequisite: Physics 102 or equivalent. 
The application and control of electricity for power, lighting, and heat are studied. Principles of operation and selection of single-phase equipment are emphasized. Conventional and solid state controls are included. Laboratories offer hands-on experience.

319 Fundamentals of Postharvest Physiology, Handling, and Storage of Horticultural Crops (also Pomology 310 and Vegetable Crops 319)  Fall. 3 credits. Prerequisite: a course in floriculture, pomology, or vegetable crops, or permission of instructor. 
Lecs, T R 9:05; lab, F 1:25–3:35. F. W. Liu, J. R. Hicks, J. A. Bartsch. 
The physiology—transpiration, respiration, ethylene synthesis and action, maturation, ripening, and senescence—of vegetables, flowers, and ornamental crops is studied. Environmental factors influencing the physiological process, thus affecting the quality and marketability of the products, are considered. The principles and methods of harvesting, cleaning, grading, packing, processing, and handling of the products are studied. Storage methods, including common storage, refrigerated storage, controlled-atmosphere storage, and hypobaric storage, are discussed.

321 Soil and Water Management  Spring. 2 credits. S-U grades optional. Concurrent registration in Agronomy 321 required. 
An interdisciplinary course intended to introduce students to the general principles of soil and water interactions and the design of management systems to influence these processes. Aspects of soil and water management, including hydrology, soil erosion, irrigation, drainage, and water quality are examined. Case studies from both the United States and the tropics are used to illustrate basic principles.

331 Farmstead Production Systems  Fall. 3 credits. S-U grades optional. 
Lec, M W F 11:15. K. G. Gebremedhin. 
A study of the layout and functional planning and design of farmstead production systems, animal production environments, energy utilization, and control, animal physiology and homeothermy, material handling, and waste management. Specific farmstead production systems (dairy, swine, poultry, fruit, and vegetable storage facilities) are discussed. A systems approach to agricultural production is emphasized.

332 Farm Buildings Design  Fall. 2 credits Intended for students without backgrounds in statics or properties of structural materials. 
Identification of design loads for farm buildings. Design of building components, such as beams, columns, trusses, and connections, used for farmstead production systems. Familiarization with the provisions in the National Design Specification (NDS) for wood construction. Design procedures, assumptions, and application of structural members for farm buildings. Wood is emphasized as a structural material.

371 Soil and Water I: Hydrology, Erosion, and Chemical Movement in the Landscape  Fall. 3 credits. Prerequisites: knowledge of soils, one semester of computer programming, and one year of calculus. 
Introduction to basic hydrologic processes that focus on the description of water behavior in landscapes and how management influences that behavior. The interaction of hydrologic processes with erosion, sediment, and chemical transport processes is discussed. Emphasizes basic understanding and probabilistic nature of the processes involved. Case studies are used to illustrate the interaction. Use of the microcomputer is integrated throughout the course.

401 Career Development in Agricultural Engineering  Fall. 1 credit. Limited to seniors. S-U grades only. 
A career development seminar for majors in the field of agricultural and biological engineering. Presentations of career opportunities, interviews with independent businesses, consulting, and public service. Professionalism, ethics, and public policy issues are discussed.

420 Introduction to Marine Pollution and Its Control  Summer. 2 credits. Prerequisite: Biological Sciences 364 or permission of instructor. A special 2-week course required at Cornell's Shallows Marine Laboratory. For more details and application, contact the SML office, G14 Stimson Hall. Estimated cost $590. 
Daily labs, recs, and fieldwork for 2 weeks. SML faculty. 
Dispersion modeling and the effects of pollutants (including oil, outfalls, solid wastes, sludge and dredge spoils, and radioactive wastes) are discussed from the perspectives of elementary physical oceanography and biological processes. Laboratories include basic methods for targeting and tracing waste water, organic carbon determinations; microbial tests for Salmonella, E. coli, and Streptococcus; and practical field projects.

451 Energy Systems Engineering  Spring. 3 credits. Prerequisite: Agricultural Engineering 250, Mathematics 294, and thermodynamics. 
This course is structured to provide engineering students with an understanding of the physical and biological principles of alternative energy technologies. Our terrestrial energy balance and the effect on energy availability will be discussed. Several technical alternatives for harvesting energy from our environment will be investigated.

461 Agricultural Machinery Design  Fall. 3 credits. Prerequisite: mechanical design or equivalent. 
The principles of design and development of agricultural machines to meet functional requirements. Emphasis is given to computer-aided analysis and design, selection of construction materials, and testing procedures. Engineering creativity and agricultural machine systems are also stressed.

462 Tractors and Power Units for Agriculture  Spring. 3 credits. Prerequisites: engineering dynamics, thermodynamics, and agriculture engineering. 
Grain drying, straw handling, and material handling for agricultural engineering applications, with an introduction to dimensional analysis and similitude.

466 Engineering Design and Analysis of Food Processing Equipment  Spring. 3 credits. Prerequisite: Food Science 321, its equivalent, or concurrent enrollment in an engineering curriculum. 
Engineering analysis and design of equipment for transporting and modifying food products. Emphasis is on maintaining food quality and conserving energy in systems for processing food.

467 Agricultural Engineering Bioprocessing Applications in Agriculture  Fall. 4 credits. Prerequisites: Biotechnology 231, College biology and calculus, one year each; Agricultural Engineering 250 or Engineering 219, or senior standing in life sciences. May not be taken for credit after Chemical Engineering 463. 
Lecs, T R 10–12. J. B. Hunter. 
An introduction to microbial and enzymatic process technology for engineers and life scientists. A substantial introduction to process engineering is illustrated by case studies. Students will learn the design and operation of bioprocessing systems. Emphasis on engineering analysis and design. Suitable for both engineers and life scientists seeking careers in the biotechnology industry.

475 Environmental Systems Analysis  Fall. 3 credits. Prerequisite: computer programming and one year of calculus. 
Systems analysis and its use in environmental quality management. Emphasis is on mathematical modeling of environmental problems, translation of models into efficient computational algorithms, and use of computer simulation and optimization procedures (search techniques, linear programming, dynamic programming, and separable programming). Applications include pollution control and resource management problems.
481 Agricultural Structures Design Spring. 3 credits. Prerequisite: permission of instructor. Lecs. T R 12:20, disc-lab, T 1:25–4:25.

K. G. Gehrman

Conventional and contemporary methods of structural analysis and design of agricultural structures, including design of columns, beams, trusses, rigid frames, prefabricated panels, shear walls, and horizontal diaphragms. Wood is emphasized as a structural material. The course includes computer-aided design (CAD) and analysis of farm buildings using existing software.

482 Environmental Control for Animals and Plants Spring. 3 credits. Prerequisite: Agricultural Engineering 250 or equivalent, and fluid mechanics. Lecs, T R 11:15; lab, M 1:25–4:25. L. D. Albright.

Analysis and design of the thermal environment of animal housing and greenhouses. Heat flow, air flow, psychrometrics, energy balances, thermal modeling, mechanical and natural ventilation, solar energy, and weather phenomena.

491 Highway Engineering (also Civil and Environmental Engineering 642) Spring. 3 credits. Prerequisite: junior standing in engineering, fluid mechanics, and soil mechanics (may be taken concurrently). Lecs, M F 12:20; lab, M 1:25–4:25. L. H. Irwin.

An introduction to engineering design in professional practice, using the design of highways as the subject of study. Students will use current standards and design criteria in five laboratory design projects. Topics of discussion include planning, economic analysis, human factors and public safety, route location and design, traffic engineering, hydrology and drainage design, soil engineering, highway materials, pavement design, and maintenance.

497 Special Problems in Agricultural Engineering Fall or spring. Variable 1–3 credits. S-U option. Normally reserved for seniors in upper two-fifths of their class. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work and assign the grade. Prerequisite: adequate ability and training for the work proposed. Staff.

Special work in any area of agricultural engineering on problems under investigation by the department or of special interest to the student, provided, in the latter case, that adequate facilities can be obtained.

501–502 M.P.S. Project Fall and spring. 1–6 credits. Required of each M.P.S. candidate in the field. Hours to be arranged. Staff.

A comprehensive project emphasizing the application of agricultural technology to the solution of a real problem.

551–552 Agricultural Engineering Design Project Fall and spring. 6 credits. Prerequisite: admission to the M.Eng (Agr) degree program or equivalent preparation. Hours to be arranged. M. B. Timmons and staff.

Comprehensive design projects dealing with existing engineering problems in the field. Emphasis is on the formulation of alternative design proposals that include consideration of economics, non-technical factors, engineering analysis, and complete design for the best design solution.

652 Instrumentation Spring. 4 credits. Prerequisites: Mathematics 294, Physics 213, Electrical Engineering 210, and Biological Sciences 109–110, or permission of instructor. Lecs, T R 12:20–1:35; lab to be arranged. D. J. Anehashley.

Application of instrumentation concepts and systems to the measurement and control of environmental and biological parameters. Instrument characterization, signal-conditioning techniques and related electronic circuits (analog and digital), transducer characterization, and data acquisition and control with personal computers are topics considered. A final design project is required, the design, construction, and evaluation of an instrument and/or control system, intended for seniors and first-year graduate students.

655 Thermodynamics and its Applications Spring. 3 credits. Prerequisite: Mathematics 293 or equivalent. Lecs, M W F 12:20; J-Y Parlange.

Thermodynamics and its applications to problems in engineering and agriculture. Topics include basic concepts (equilibrium, entropy, processes, systems, potentials, stability, phase transitions) and applications (soil and water processes, dilute solutions, electromagnetic, surface phenomena, heat and mass transport, structure of organizations).

671 Analysis of the Flow of Water and Chemicals in Treatment and Control of Agricultural Waters Fall. 3 credits. Prerequisite: permission of instructor. W. J. Jewell.


The course encompasses the full range from simple to complex methods to describe the physical and chemical characteristics of water and water flows on the surface, in the vadose zone, and through the aquifer. Current analytical, semi-analytical, and computer-based techniques are discussed. Both homogeneous and heterogeneous soils are analyzed. Laboratory work is conducted alternately with Civil and Environmental Engineering 633—a complementary, but not identical, course.


Lecs, M W F 10-10; lab, T 12:20–4:25. T. S. Steenhuis.

The physics of groundwater flow with specific reference to tile drainage. Critical review of benefits of drainage as well as a thorough analysis of the design of drainage systems. Emphasis will be on getting a broad understanding of irrigation systems through the use of case studies.

673 Irrigation Systems Spring. 3 credits. Prerequisite: permission of instructor. W. J. Jewell.

An introduction with a systems perspective to the design and implementation of irrigation. Topics include systems planning and appraisal, irrigation structures and measurements, water distribution, and scheduling. Emphasis will be on getting a better understanding of irrigation systems through the use of case studies.

677 Treatment and Disposal of Agricultural Wastes Fall. 3 credits. Prerequisite: permission of instructor.

3 lecs, hours to be arranged. Staff.

Emphasis is on the causes of agricultural waste problems and the application of fundamentals of treatment and control methods to minimize related pollution. Fundamentals of biological, physical, and chemical pollution control methods are applied to wastes from animals, food production, and food and fiber processing, with actual systems as examples.

678 Non-Point Source Models Spring. 3 credits. Prerequisites: Computer programming and calculus. Lecs, M W F 10:10. M. F. Walter.

An introduction to the design of agricultural systems and the physics of water flow with specific reference to tile drainage. Critical review of benefits of drainage as well as a thorough analysis of the design of drainage systems. Emphasis is on prediction of water and chemical inputs to surface waters and groundwater. The physics of groundwater flow will be discussed. Emphasis will be on getting a broad understanding of irrigation systems through the use of case studies.

679 Use of Land for Waste Treatment and Disposal Spring. 3 credits. Prerequisite: permission of instructor. Lecs, T R 3:35–4:50. W. J. Jewell.

Covers social, legal, and technical factors; the properties of land and crop systems that make land application of wastes a viable alternative; and the use of fundamentals in the development of regulations and the design of full-scale units.

682 Building Environment Control Fall. 3 credits. Prerequisite: one course in building environment control and a course in heat transfer. Offered alternate years. Not offered 1987–88.

HOURS to be arranged. L. D. Albright.

Topics include thermal insulation of buildings, and the environment of buildings, natural ventilation processes in buildings, sensors and controllers, and psychrometric processes.

685 Biological Engineering Analysis Spring. 4 credits. Prerequisite: Theoretical and Applied Mechanics 310 or permission of instructor. L. M. 12:20; J. R. Swihart.

Engineering problem-solving strategies and techniques are explored. Students solve several representative engineering problems that inherently involve biological properties. Emphasis is on formulation and solution of mathematical models and the interpretation of results. The student's knowledge of fundamental principles is used extensively.

692 Highway Materials and Pavement Design (also Civil Engineering 643) Fall. 4 credits. Limited to engineering seniors and graduate students. Prerequisite: one introductory course in soil mechanics or highway engineering. Lecs, M T R 12:20; lab, M 1:25–4:25. L. H. Irwin.

Application of geotechnical engineering principles to the selection of materials and the design of highway and airfield pavements. Laboratory will provide experience with materials testing, asphalt concrete mix design, and chemical soil stabilization. Topics of discussion will include properties of asphalt, aggregates, and bituminous mixture design; base-course design; design of flexible and rigid pavements; design for frost conditions, and pavement evaluation using nondestructive test methods.

700 General Seminar Fall. No credit. S-U grades only. M 12:00. Staff.

Presentation and discussion of research and special developments in agricultural engineering and related fields.

701 Special Topics in Agricultural Engineering Fall or spring. 1–6 credits. Prerequisite: permission of instructor. S-U grades optional. Hours to be arranged. Staff.

Topics are arranged by the staff at the beginning of the term.

750 Orientation for Research Fall. 1 credit. Limited to newly joining graduate students. S-U grades only.

Lecs, first 7 weeks, M 3:35; remainder to be arranged. L. D. Albright.

An introduction to departmental research policy, programs, methodology, resources, and degree candidates' responsibilities and opportunities.

754 Sociotechnical Aspects of Irrigation (also Rural Sociology 754 and Agricultural Economics 754) Spring. 3 credits. HOURS to be arranged. M. F. Walter, R. Barker, E. W. Coward, Jr.

Examines irrigation agriculture and its relation to agricultural development. Emphasis on social processes within irrigation systems and interactions with the social setting. The course provides an opportunity to examine systematically the institutional and organizational policy issues associated with the design and operation of systems of irrigated agriculture.
44 Agriculture and Life Sciences

761 Power and Machinery Seminar Spring 1 credit. Limited to graduate students. Prerequisite: permission of instructor. S-U grades only. Hours to be arranged. W. W. Gunkel. Study and discussions of research and new developments in agricultural power and machinery.

771 Soil and Water Engineering Seminar Fall and spring 1-3 credits. Prerequisite: graduate status or permission of instructor. S-U grades optional. Hours to be arranged. T. S. Steenhuis, M. F. Walter, J. R. Bouldin. Study and discussion of research or design procedures related to selected topics in irrigation, drainage, erosion control, hydrology, and water quality systems.

775 Agricultural Waste Management Seminar Spring 1 credit. Prerequisite: permission of instructor. S-U grades only. Hours to be arranged. Staff. Management of agricultural wastes, with emphasis on physical, chemical, biological, and economic factors affecting waste production, treatment and handling, utilization, and disposal.

781 Agricultural Structures and Related Topics Seminar Spring 1 credit. Prerequisite: graduate status or permission of instructor. S-U grades only. Disc to be arranged. K. G. Gehrmen. Consideration of farmstead production systems, with emphasis on biological, economic, environmental, and structural requirements.

795 Biological Engineering Seminar Spring 1 credit. Prerequisite: graduate status or permission of instructor. S-U grades only. Disc to be arranged. J. R. Cooke. The interactions of engineering and biology, especially the environmental aspects of plant, animal, and human physiology, are examined in order to improve communication between engineers and biologists.

Agronomy


Courses by Subject

Crop Science: 311, 312, 314, 315, 317, 316, 608, 610, 611, 612, 613, 614, 690
Remote Sensing: 660, 661, 662
Soil Science: 190, 260, 321, 361, 362, 372, 373, 385, 466, 471, 476, 477, 483, 484, 466, 666, 667, 669, 675, 676, 694, 771, 774

131 Basic Principles of Meteorology Fall 3 credits. Limited to 75 students. Lecs. T R 11:15, lab, T W or R 1:25--4:25. B. E. Dethier. A simplified treatment of the structure of the atmosphere: heat balance of the earth; general and secondary circulations; air masses, fronts, and cyclogenesis; hurricanes, thunderstorms, tornadoes, and atmospheric condensation. In the laboratory emphasis is on techniques of analysis of weather systems.

190 Food and Fiber Production: Possibilities and Perils Spring 2 credits. Limited to 40 students. S-U grades optional. Lecs. T 9:05--9:55, labs, R 9:05--11 or R 1:25--3:20. T. W. Scott, W. W. Knapp, M. J. Wright. Crops, climate, and soil are elements of the system that supports civilization. By developing agriculture, people increased their control over crop production. A continual upward trend in population creates the need to explore the limitations of our resources and technology. This course acquaints the student with some important aspects of crop, climate, soil, and their interactions. The detrimental effects of present agricultural practices on the environment and some proposed solutions will be considered. Laboratory exercises will provide hands-on experience with soil and plant materials and meteorological instruments.

260 Introduction to Soil Science Spring 4 credits. Prerequisite: Chemistry 103, 207 or 215. S-U grades optional. Lecs. M W F 9:05, lab, M T W or R 1:25. D. J. Lathwell. A comprehensive introduction to the field of soil science, with emphasis on scientific principles and their application to solving practical soil-management problems. The last weeks of the semester will be devoted to several different topics, to provide broad experience in soil science.

311 Grain Crops Fall 4 credits. Prerequisite: Agronomy 260 or Biological Sciences 241. Lecs. M W 10:10, lab, M or T 1:25--4:25. 1 or 2 field trips during lab periods (until 5 p.m. or on weekends). R. L. Obendorf. Principles of field-crop growth, development and maturation, species recognition, soil and climatic adaptations, timing and mineral nutrition, weed control, cropping sequences, management systems, and crop improvement are considered. Grain: protein, fiber, and sugar crops are emphasized.

324 Forage Crops Spring 4 credits. Prerequisites: Agronomy 260 or Biological Sciences 241 or equivalent. Recommended: Animal Science 112. Lecs. M W F 11:15, lab, M T W or R 1:25--4:25. G. W. Fick. The production and management of crops used for livestock feed are considered in terms of establishment, growth, maintenance, harvesting, and preservation. Forage grasses, forage legumes, and corn are emphasized, and consideration is given to their value as livestock feed in terms of energy, protein, and other nutritional components.

3[414 Production of Tropical Crops Spring 3 credits. Prerequisite: Agronomy 260 or Biological Sciences 241, or equivalent. Offered alternate years. Lecs. M W F 10:10, lab, M T W or R 1:25--4:25. W. F. Lee. An introduction to the characteristics and culture of the principal food staple crops of the tropics and subtropics and of some of the crops grown for export. Vegetables and fruits are not emphasized.]

315 Weed Science Fall 3 credits. Prerequisites: Agronomy 260, and Biological Sciences 103 and 104 or Biological Sciences 241. Lecs, T R 8; lab, M or T W 2--4:25. Staff. Principles of weed science are examined. Emphasis is given to (a) weed ecology, (b) chemistry of herbicides in relation to effects on plant growth, and (c) control of weeds in all crops. Laboratories cover weed identification, herbicide selectivity, herbicide injury symptoms, and farm herbicide problem solving.

317 Seed Science and Technology Fall 3 credits. Prerequisites: Basic Sciences 241 or equivalent. Offered alternate years. Lecs, T R 11:15, lab, R 1:25--4:25. 1 all-day field trip will be scheduled during the semester. G. A. Taylor, Gen Engineering Station. (thru contact, R. L. Obendorf.) The principles and practices involved in the production, harvesting, processing, storage, testing, quality management, certification, and use of high-quality seed from improved cultivars. Information is applicable to various kinds of agricultural seeds.

321 Soil and Water Management Spring 2 credits. Concurrent registration in Agricultural Engineering 321 required. S-U grades optional. Lecs, M W F 9:05, lab, M T W or R 1:25--4:25. T. W. Scott, M. F. Walter, R. T. Oglesby, N. L. Bills. An interdisciplinary course intended to introduce students to the general principles of soil and water interaction and to develop an understanding of how these principles are applied in the environment and some proposed solutions will be considered. Laboratory exercises will provide hands-on experience with soil and plant materials and meteorological instruments.

334 Agricultural Meteorology Spring 3 credits. Limited to 35 students. T R 10--11:25. D. S. Wilks. An introduction to the relationships of radiant energy, temperature, wind, and moisture in the atmosphere near the ground. The interplay between physical processes of the atmosphere, plant canopies, and soil is examined. Moisture relationships in the atmosphere-soil-plant system, the effects of environmental modification, and the bioclimatic requirements of plants are also discussed.

335--336--337--338 Meteorological Communications 335 and 337, fall; 336 and 338, spring. Limited to 18 students. Staff. Students become acquainted with both DIFAX and NAFAX facsimile maps, plus Micro VAX weather data received via satellite. Weathercasting on local radio and TV stations is studied.


362 Soil Morphology Fall 1 credit. Undergraduates only. Recommended for sophomores and juniors. M W F 9:05, lab, R 1:25--4:25. all-day field trip required. R. B. Bryant. The principles for field identification of soil properties, profiles, and landscapes are presented. A series of soil pits are examined, described, classified, and interpreted in the field.

372 Soil Fertility Management Fall 3 credits. Prerequisites: Agronomy 260 or permission of instructor. M W F 9:05, R. D. Bouldin. An integrated discussion of soil-crop yield relationships, with emphasis on the soil as a source of mineral nutrients for crops and the role of fertilizers and manure in crop production.

373 Soil, Water, and Aquatic Plants Fall 3 credits. Prerequisites: Agronomy 260, Biological Sciences 101--102, and Chemical Science 104 or equivalents. T R 11:15, T 1:25--4:25. J. H. Pevery. The success or failure of soil and water management is manifested in streams, wetlands, lakes, and aquifers. Chemical and biological changes downstream are studied and related to agricultural management techniques. Basic chemical and physiological processes are presented and used to suggest appropriate responses to water management problems.
The impact of agriculture on aspects of the global biogeochemical cycles of carbon, nitrogen, sulfur, and phosphorus is discussed and illustrated with current agricultural and environmental issues. Topics include sustainable agriculture, effects of nitrogen fixation, acid rain, the carbon dioxide problem, and land disposal of wastes.

441–442 Theoretical Meteorology I and II 441, fall; 442, spring. 3 credits each semester. Prerequisites: A year each of calculus and physics. M W F 10:10. W. W. Knapp.
Fall semester topics include thermodynamics of dry air, water vapor and moist air, hydrostatics and stability. Topics considered in the spring term include meteorological coordinate systems, variation of wind functions of organisms in soil.


Primarily a survey of natural phenomena of the atmosphere, with emphasis on their underlying physical principles. Topics include composition and structure of the atmosphere, atmospheric optics, acoustics and electricity, solar and terrestrial radiation, and principles of radar probing of the atmosphere.]

451 Synoptic I Fall. 4 credits. Prerequisites: Agronomy 441 and 442, or permission of instructor. Lecs, T R 9:05; lab, M 1:25–3:20. D. A. Paine.
The application of quasi-geostrophic theory as a diagnostic and forecast methodology. Isentropic theory and analysis applied to a classic case of cyclogenesis. Special emphasis given to the prediction of severe local storms.

452 Synoptic II Spring. 4 credits. Prerequisite: Agronomy 450 or permission of instructor. Lecs, T R 9:05; lab, M 1:25–3:20. D. A. Paine.
A practicum in the history of numerical weather prediction. The current and future status of computer guidance in meteorology. Students prepare data and run a variety of storm situations. Model-generated computer graphics become the basis for a term project.

How will the atmosphere and oceans respond to an increase of carbon dioxide, depletion of ozone, or onset of a "nuclear winter"? The coevolution of earth’s biosphere and climate is discussed.]

Analyses of soil and plant samples are carried out with emphasis on analytical problem solving and evaluation of the experimental data. Sampling philosophy and preliminary treatment of samples are covered. A variety of wet chemistry and instrumental methods, including titrimetry, gravimetry, potentiometry, infrared spectroscopy, and atomic absorption and emission spectroscopy, are employed.

An introduction to the chemical nature and reactions of the mineral and organic components that comprise soils. The effects of environmental pollution, waste disposal, and agricultural practices on soil chemical properties are described using specific examples.

499 Undergraduate Research Fall or spring. Credit to be arranged. Written permission from the staff member who will supervise the work and assign the grade must be attached to course enrollment material. Hours to be arranged. Staff.
Independent research on current problems selected from any phase of crop science, meteorology, or soil science.

[608 Water Status in Plants and Soils Fall. 1 credit. Prerequisite: permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88. Lec, 1 hour to be arranged; lab, R 1:25–4:25 or as arranged. R. D. Miller, T. L. Setter. Techniques for field appraisal of the status of water in plants and soil, including methods used in evapotranspiration studies.]

610 Physiology of Environmental Stresses Spring. 3 credits. Prerequisite: Biological Sciences 242 or 341. Offered alternate years. Lecs, T R 10:10–11:25. L. P. Steponkus. A study of the responses of plants to environmental stresses, including chilling, freezing, high temperature, and drought. Emphasis is on the physiological and biochemical basis of injury and plant resistance mechanisms at the whole-plant, cellular, and molecular levels.

612 Seed Physiology Spring. 3 credits. Prerequisite: plant physiology. Lec, T R 8:30–9:55. R. L. Oberdorf.
Morphology, physiology, and biochemistry of cereal, legume, and oil-seed formation, composition, storage, and germination. Emphasis is on the deposition of seed reserves during seed formation, stabilization of reserves during storage, and mobilization of reserves during germination.


642 Plant Mineral Nutrition (also Biological Sciences 642) Spring. 3 credits. Prerequisite: Biological Sciences 341 or equivalent. M W F 10:10–11:50. L. V. Kochian, R. M. Welch.
A detailed study of the processes by which plants acquire and utilize mineral nutrients from the soil. Topics will include the uptake, translocation, and compartmentation of mineral elements; root-soil interactions; metabolism of mineral elements; the involvement of mineral nutrients in various physiological processes; and nutrition of plants adapted to extreme environmental stresses (e.g., salinity). Specific mineral elements will be emphasized to illustrate the above topics.

660 Remote Sensing Fundamentals Fall. 3 credits. Prerequisite: permission of instructor. Lecs, T R 10:10; lab, R 2:30–4:25. W. R. Philpion.
Fundamentals of sensing earth resources with sensors of electromagnetic radiation. Coverage includes sensors, sensor and ground-data acquisition; data analysis and interpretation, and project design.


666 Advanced Soil Microbiology Fall. 1 credit. Prerequisite: Agronomy 476 or permission of instructor. S-U grades only for graduate students. T 2:20. M. Alexander. Discussions of current topics in special areas of soil microbiology. Particular attention is given to biochemical problems in microbial ecology.

667 Soil Physics Fall. 3 credits. Prerequisites: Agronomy 260 and one year of college physics or permission of instructor. S-U grades only. Offered alternate years. Not offered 1987–88. MWF 11:15. R. D. Miller. A study of physical properties and processes in soils, with emphasis on basic principles.


675 Soil and Water Solute Modeling Spring. 3 credits. Prerequisite: Agronomy 483 or equivalent. Lecs. T R 1:25–2:45, W. J. C. Rumsey-Myers. Development, derivation, and use of models of water and solute transfer under laboratory and field conditions. Discussion of models that include transport, interaction, and transformation of solutes. Design and interpretation of experiments for model validation.


690 Root-Soil Interactions Fall or spring. 1–2 credits. S-U grades only. Hours to be arranged. R. W. Zobel. A topic dealing with root-soil interaction will be selected during the first meeting of the term. Students will prepare one or two seminars based on published work on the topic. Possible topics include root genetics, root morphology, conservation tillage, and soil temperature.

691 Special Topics in Crop Science Fall or spring. 1–6 credits. S-U grades optional. Hours to be arranged. Staff. Study of topics in crop science that are more specialized or different from other courses. Special topics to be offered will depend on staff and student interest.

692 Special Topics in Meteorology Fall or spring. 1–6 credits. S-U grades optional. Hours to be arranged. Staff. Study of topics in meteorology that are more specialized or different from other courses. Special topics to be covered will depend on staff and student interest.

693 Special Topics in Soil Science Fall or spring. 1–6 credits. S-U grades optional. Hours to be arranged. Staff. Study of topics in soil science that are more specialized or different from other courses. Special topics to be covered will depend on staff and student interest.

711 Soil Chemistry and Mineralogy Fall. 3 credits. Prerequisites: Agronomy 260 and a year of physical chemistry, or permission of instructor. Offered alternate years. MWF F 9:05; lab, R 1:25–4:25. M. B. McBride. Chemical properties of soils, with emphasis on structure and surface chemistry of soil minerals, ion exchange, mineral-solution equilibria, and adsorption reactions of soil clays and oxides. Laboratory exercises will stress the application of modern physical methods to soil mineralogy.

771 Soil Fertility Advanced Course Spring. 3 credits. Prerequisite: Agronomy 260 and a year of college physics or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88. R. D. Bouldin. A study of selected topics in soil-crop relationships, with emphasis on concepts of soil fertility, interpretation of experimental data, and soil fertilizer chemistry.

790 Agronomy Seminar Fall or spring. No credit. Required of graduate students majoring or minoring in the department. S-U grades only. T 14.

791 Meteorology Seminar Fall or spring. Prerequisite: permission of instructor. Hours to be announced. Staff. Subjects such as weather modification, paleoclimatology, and atmospheric pollution.

829 Master's-Level Thesis Research in Crop Science Fall or spring. Credit by arrangement. Limited to students in the graduate field. Hours by arrangement.

859 Master's-Level Thesis Research in Meteorology Fall or spring. Credit by arrangement. Limited to students in the graduate field. Hours by arrangement.

889 Master's-Level Thesis Research in Soil Science Fall or spring. Credit by arrangement. Limited to students in the graduate field. Hours by arrangement.

929 Doctoral-Level Thesis Research in Crop Science Fall or spring. Credit by arrangement. Limited to students in the graduate field. Hours by arrangement.

959 Doctoral-Level Thesis Research in Meteorology Fall or spring. Credit by arrangement. Limited to students in the graduate field. Hours by arrangement.

989 Doctoral-Level Thesis Research in Soil Science Fall or spring. Credit by arrangement. Limited to students in the graduate field. Hours by arrangement.

Courses in "Remote Sensing" are also listed under the Department of Civil and Environmental Engineering, in the College of Engineering.

Animal Sciences


101 Biology of Domestic Animals Fall. 2 credits. For beginning students. S-U grades optional. Normally taken concurrently with Animal Sciences 102. Lecs, W F 9:05. W. B. Currie. An introduction to the biology of domestic animals in the context of commercial animal production. Required readings and assignments expose the student to an introductory treatment of the anatomy and physiology of domestic animals. The lectures focus on processes (growth, development, nutrition, locomotion, reproduction, egg production, lactation, etc.) that illustrate the application of the biological material to the science of animal production and use.

102 Introductory Animal Management Fall. 2 credits. For beginning students. S-U grades optional. Normally taken concurrently with Animal Sciences 101. Lecs, M 9:05, lab T W or R 2–4:25, M. L. Thonney. An introduction to the livestock industries and animal management. Designed to acquaint the student with dairy and beef cattle, sheep, swine, horses, and poultry, including as much hands-on experience as possible. The feeding, breeding, lactation, growth, and carcass merit of these animals are also considered.

105 Contemporary Perspectives of Animal Science Spring. 1 credit. Limited to freshmen, sophomores; and first-year transfers. T 1:25, W 12:20. R. G. Warner, R. C. Gorewit. A forum to discuss the contemporary and future role of animals in relation to human needs and students' career planning.

112 Livestock Nutrition Spring. 4 credits. Prerequisite: Chemistry 103 or 207 Recommended: Animal Sciences 101 and 102. Lecs, MWF F 10:10; lab, M T W R or F 2–4:25, or R 10:10–12:20. R. G. Warner. An introduction to animal nutrition covering fundamentals of nutrition, the nutritional value of feeds, and the application of feeding standards to various forms of production in dairy and beef cattle, sheep, swine, horses, and poultry.

113 Nutrition of Companion Animals Fall. weeks 1–7. 1 credit. Prerequisite: Animal Sciences 112 or equivalent. S-U grades only. W 7:30–9:25 p.m. H. F. Hintz. Nutrition of companion animals, with emphasis on the dog and cat. Digestive physiology, nutrient requirements, feeding practices, and interactions of nutrition and disease.

220 Animal Reproduction and Development Spring. 4 credits. Each lab limited to 36 students. Prerequisite: a year of college biology or equivalent. Lecs, T R 9:05, demonstration and lab, M T W R or F 2–4:25 or T 10:10–12:35 or F 12:20–2:45. R. H. Foote, J. Parks.
321 Seminar on Genetics of the Horse Spring 1 credit. Prerequisite: Animal Sciences 265 or permission of instructor. Recommended: Animal Sciences 221 or Biological Sciences 281.
M or W 9:05. L. D. VanLuenec.
A discussion of genetics of the horse, with special references to simply inherited traits and selection for quantitative traits.

330 Commercial Poultry Production Fall. 2 credits. Prerequisite: Animal Sciences 101, 102, 230, or permission of instructor. Offered in odd-numbered years.
F 2:30-3:30. D. L. Cunningham.
The course emphasizes production and business management aspects of commercial poultry farm operation and is designed to acquaint the student with current technology involved in commercial poultry production.

332 Poultry Hygiene and Disease (also Veterinary Medicine 255) Spring, even-numbered years. 2 credits. Not offered 1987-88. Limited to juniors and seniors.
Lab, W 2:05-4:25. S-U grades only.

250 Dairy Cattle Fall. 3 credits. S-U grades optional.
Introduction to the background and scientific principles relating to dairy cattle production. Laboratories are designed to provide an understanding of production techniques. This course is a prerequisite for Animal Sciences 455.

251 Dairy Cattle Selection Spring. 2 credits. Prerequisite: Animal Sciences 250 or equivalent.
Lab, W 2:20-4:25. 1 all-day S field trip.
D. M. Galton.
Emphasis on economical and type traits to be used in the selection and evaluation of dairy cattle. Practical sessions include planned trips to dairy herds in the state.

265 Horses Spring. 3 credits. Prerequisite: Animal Sciences 101 and 102 or permission of instructor. S-U grades optional.
Selection, management, feeding, breeding, and training of light horses.

290 Meat Science Fall. 3 credits.
An introduction to the meat science through a study of the structure, composition, and function of muscle and its conversion to meat. Properties of fresh and processed meat, microbiology, preservation, nutritive value, inspection, and sanitation are also studied. Laboratory exercises include meat-animal slaughter, meat cutting, wholesale and retail cut identification, anatomy, processing, inspection, grading, quality control, and meat merchandizing. Students have the opportunity to choose which labs they wish to participate in. An all-day field trip to commercial meat plants is taken.

305 Farm Animal Behavior Spring. 2 credits. Prerequisites: Animal Science 112, 220, and 221; at least one animal production course recommended. S-U grades optional.
The behavior of production species (avian and mammalian) influences the success of any management program. Students will study behaviors relating to feeding, reproduction, and social interactions of poultry, cattle, sheep, and swine. Management systems for commercial livestock production and their implications for animal behavior and welfare will be studied.

380 Sheep Spring. 3 credits. Prerequisite: Animal Sciences 101 and 102. Recommended: Animal Sciences 122, 220, and 221.
The breeding, feeding, management, and selection of sheep. Lectures and laboratories are designed to give students a practical knowledge of sheep production as well as the scientific background for improved practices.

390 Meat Animal Growth and Evaluation Spring. 2 credits. Prerequisites: Animal Sciences 101 and 102 or permission of instructor.
Fundamental biological principles of meat animal growth and factors influencing composition are presented. Principles and techniques of meat animal and carcass grading and evaluation are discussed and followed by student evaluation of live animals and the carcasses from them.

392 Animal Growth Biology Fall. 2 credits. Not open to freshmen; sophomores by permission of instructor only. Prerequisites: one year of college biology and one term in animal physiology. Animal Sciences 112, and Animal Science 221.
A detailed discussion of the anatomy and physiology of growth in domestic farm animals. Cellular aspects of tissue-growth patterns, their relationship to body composition, and measurement of growth and body composition will be discussed. Endocrine, genetic, nutritional, and pharmacological influences on growth, metabolism, and body composition will be emphasized.

400 Livestock Production in Warm Climates Spring. 3 credits. Prerequisite: Animal Sciences 112, 220, or 221 or permission of instructor.
An analysis of constraints on livestock production in developing countries of the tropics, economic objectives and risk, and production methods. Emphasis is on strategic use of animal and plant resources, animal performance with inputs restricted, decision making, and alternative systems of production. Principles, real examples, and independent study projects will help identify research to improve food security.

401 Dairy Production Seminar Spring. 1 credit. Limited to juniors and seniors.
Disc, M 7:30 p.m. D. E. Bauman.
Students, with the help of faculty members, complete a study of the research literature on topics of current interest in the dairy industry. Students make oral and written reports.

402 Seminar in Animal Sciences Spring. 1 credit. Limited to juniors and seniors. May be repeated. S-U grades optional.
Hours to be arranged. L. D. VanVleck and staff.
Review of literature pertinent to topics of animal science or reports of undergraduate research and honors projects. Students present oral and written reports.

403 Forages of the Tropics for Livestock Production Spring. 3 credits. Limited to seniors and graduate students except by permission of instructor. Prerequisites: crop production and livestock nutrition. Offered even-numbered years.
An overview of tropical grasslands, seeded pastures, and crop residues as feed resources; grass and legume characteristics; establishment and management of pastures; determination of feeding-value forages and crop residues; physiology of digestion of ruminants; effects of environmental and managerial practices on growth of various species; problems of chemical inhibitors in plants; and utilization of tropical forages as hay or silage.
Agriculture and Life Sciences

410 Principles of Animal Nutrition Fall. 3 credits. Prerequisite: organic chemistry. Recommended: biochemistry or concurrent registration in a biochemistry course. M W F 11:15; 2 discs to be arranged. 2 evening prelms to be arranged. C. C. McNeill. A fundamental approach to nutrition focusing on the metabolism as well as the biochemical and physiological function of the known nutrients. The basic principles of nutrition are elaborated with examples drawn from a broad range of animal species, including humans. Emphasis is also directed toward nutritional techniques and the application of the topics covered.

415 Poultry Nutrition Spring. 1 credit. Prerequisite: Animal Sciences 410 or permission of instructor. F 11:15. G. F. Combs, Jr. A practical consideration of principles of nutrition applied to feeding poultry, including use of linear programming techniques in diet formulation.

418 Mutagenesis and Genetic Toxicology (also Toxicology 418) Spring. 2 credits. Prerequisites: introductory courses in genetics or biochemistry or permission of instructor. Offered odd-numbered years. Not offered 1987–88. Lec/disc: T 1:25–3:20. S. E. Bloom. A study of the alterations in the genetic material of animals and people by natural and human-produced chemicals. Topics include attacks on DNA by mutagens, repair of DNA lesions, gene and chromosome mutation, spindle poisons, mutations and cancer, genetic toxicology testing, and risk assessment.

419 Animal Cytogenetics (also Toxicology 419) Fall. 4 credits. Prerequisites: Animal Sciences 221, Biological Sciences 281, or permission of instructor. Lec, T R 9:05; disc: T or W 1:25–3:20. S. E. Bloom. A study of normal and abnormal chromosomes in higher animals. Lecture topics include chromosome organization, chromosome movement, cytogenetics of abourtuses, parthenogenesis, chromosomes and cancer, mitotic and meiotic errors, human clinical cytogenetics, and biotechnology.

420 Quantitative Animal Genetics Fall. 3 credits. Lec: T R 11:15, lab W or F 2–4:25. L. D. VanVleck. A consideration of problems involved in improvement of animals, especially farm animals, through application of the theory of quantitative genetics, with emphasis on selection index.

421 Seminar in Animal Genetics Fall. 1 credit. Prerequisite: Animal Sciences 221 or concurrent registration in Animal Sciences 420. T 12:20. L. D. VanVleck. A discussion of applications of principles of quantitative genetics and animal breeding to specific types of animals such as dairy animals, meat animals, and horses.

422 Research Techniques in Quantitative Animal Genetics Fall. 1 credit. Prerequisite: Animal Sciences 221 or concurrent registration in Animal Sciences 420. R 12:20. L. D. VanVleck. An introduction to methods of research in quantitative genetics and animal breeding, including estimation of heritability, repeatability, and genetic and phenotypic correlations.

427 Fundamentals of Endocrinology Fall. 3 credits. Prerequisite: human or veterinary physiology or permission of instructor. Lecs, M W F 9:05; L. R. Butler. The physiology of the endocrine glands and the roles played by each hormone in the regulation of normal body processes. Endocrine regulation of growth, metabolism, and reproduction is emphasized. Examples are selected from domestic species and humans.

428 Fundamentals of Endocrinology, Laboratory Fall. 2 credits. Each lab limited to 30 students. Concurrent registration in Animal Sciences 427 or permission of instructor. Not offered 1987–88. Lab, T R 1:25–4:25. W. R. Butler. Laboratory exercises are designed to demonstrate hormonal mechanisms for each of the major endocrine glands. Laboratory techniques include animal surgery, blood collection, and hormone radioimmunoassay. Several species of domestic and laboratory animals are utilized.

430 Artificial Breeding of Farm Animals Fall. Starting August 15. 2 credits. Prerequisites: Animal Sciences 220 or permission of instructor must be obtained at course enrollment. Lecs, T R 9:05 first seven weeks. Labs: M T W R F 8:30–4:30, sec 1, Aug. 13–19, sec 2, Aug. 20–26. R. H. Foote. Principles of artificial breeding and practical animal and laboratory experience in semen collection, semen evaluation, semen freezing, and artificial insemination of farm animals.

431 Embryo Handling and Transfer Fall. 1 credit. Prerequisites: Animal Sciences 220 and 430 or their equivalents. Begins immediately after Animal Sciences 430 and goes for two weeks, including fall break. Permission of instructor must be obtained at course enrollment. S-U grades only. Lab fee.

450 Immunophysicsiology Spring. 3 credits. Prerequisite: basic immunology and animal physiology or permission of instructor. Lecs, M W F 11:15. 2 evening prelms to be arranged. J. A. Marsh. Emphasis on the development and regulation of the immune system and the physiological parameters affecting or affected by immune function. Major topics include development immunology, immunoregulation, immunological involvement in reproduction and gonadal function, interrelationships between immune and endocrine functioning, and the immunity of aging.

451 Lactation Biology Spring. 3 credits. Prerequisite: either Animal Sciences 220 and Biological Sciences 231 or permission of instructor. Lecs, T R 9:05; labs, B, R. C. Gorewit. Emphasis is on mammary gland development, anatomy, physiological control of milk secretion, and biochemical synthesis of milk constituents in farm and laboratory animals.

455 Dairy Herd Management Spring. 4 credits. Prerequisites: Animal Sciences 112, 220, 221, and 250, or equivalents. Recommended: Agricultural Economics 302. Lecs, M W F 11:15; lab, M T 1:25–4:25; plus 1 unscheduled half-day/lab period. W. G. Merrill and staff. Application of scientific principles to practical herd management, analyses of alternatives, and decision making. Laboratories emphasize practical applications, problem solving, and discussion.

456 Dairy Management Fellowship Fall or spring. 2 credits. Limited to seniors. Prerequisites: Animal Sciences 455, Agricultural Economics 202 or equivalent, and permission of instructor. S-U grades only. Hours to be arranged. D. M. Galton. The program is designed for undergraduates who have a sincere interest in dairy farm management. Objectives are to gain further understanding of the integration and application of dairy farm management principles and programs with respect to dairymen’s objectives and methodology, to expand the concept of team approach in the development and implementation of management programs, and to gain further understanding of the role of research and industry in agriculture. Students are selected during the spring semester of the junior year according to their commitment to dairy farm management in course program and career goals.

457 Dairy Herd Health Fall. 1 credit. Must be taken concurrently with Animal Science 456; S-U grades only. Lec, R. B. labs 2–4 hours, weeks to be arranged. D. M. Galton. Emphasis on the application of disease control practices and preventive medicine programs in dairy herd health. Laboratories are designed to provide students the opportunity to learn management skills.

486 Immunogenetics (also Biological Sciences 486) Fall. 3 credits. Limited to seniors (25) and graduate students. Prerequisite: an introductory course in genetics is required. Prior or concurrent enrollment in basic immunology is also required. Lecs, M W F 10:10. R. R. Dietert. The genetic control of a variety of cellular antigens and their use in understanding biological and immunological functions. The genetics of antibody diversity, antigen recognition, immune response, transplantation, and disease resistance.

490 Commercial Meat Processing Spring. 3 credits. Prerequisite: Animal Sciences 290 or permission of instructor. Offered every other year. Lecs, T R 9:05, lab, T R 1:25–4:25. Field trip to commercial meat processing plants. D. H. Beermann. A study of the classification, formulation, and production of commercially available processed meat products. Physical and chemical characteristics of meat and nonmeat ingredients; their functional properties; various methodologies; microbiology; packaging, handling, and storage, and quality assurance are discussed.

497 Special Topics in Animal Sciences Fall or spring. 1–3 credits; may be repeated for credit. Intended for students in animal sciences. Prerequisite: permission of instructor. S-U grades only. Staff. May include individual tutorial study or a lecture topic selected by a professor. Since topics may change, the course may be repeated for credit.

498 Undergraduate Teaching Fall or spring. 1 or 2 credits; 4 credits maximum during undergraduate career. Limited to students with grade-point averages of at least 2.7. Designed to consolidate the student's knowledge. A participating student assists in teaching a course allied with the student's education and experience. The student is expected to meet regularly with a discussion or laboratory section, to gain teaching experience, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

499 Undergraduate Research Fall or spring. 6 credits maximum during undergraduate career. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Limited to juniors and seniors with grade-point averages of at least 2.7. Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature, prepare a project outline, conduct the research, and prepare a report.

600 Research Fall or spring. Credit to be arranged. S-U grades optional. Hours to be arranged. All members of animal sciences program area.
601 Proteins and Amino Acids in Nutrition (also Nutritional Sciences 601) Spring. 2 credits. Prerequisites: physiology, biochemistry, and nutrition, or permission of instructor. Letter grades only. Offered even-numbered years.
WF 10:10. R. E. Austin.
A course in amino acid and protein nutrition, with emphasis on the dynamic aspects of protein digestion and amino acid absorption, protein and amino acid metabolism, nutritional interrelationships, assessment of protein quality, amino acid availability, and amino acid requirements in humans, monogastrics, and ruminants.

604 Vitamins Fall. 2 credits. T R 10:10. G. F. Combs, Jr.
A discussion of the chemistry, biochemistry, and physiological functions of the vitamins, with emphasis on nutritional aspects.

605 Forage, Fiber, and the Rumen Spring. 4 credits. Prerequisites: either general nutrition and biochemistry or permission of instructor. S-U grades optional.
Ruminal nutrition; lower tract fermentation in monogastrics; nutritional biochemistry of forage plants, fiber, and cellulose material.

607 Microbiology of the Rumen Fall. 3 credits. Prerequisites: general biochemistry and microbiology. Offered even-numbered years. Not offered 1987–88.
Nutrition, biochemistry, physiology, taxonomy, and ecology of rumen microorganisms. Effects of rumen microbial ecology on ruminal nutrition. Manipulation of rumen fermentations to maximize host-animal performance.

609 Seminar in Poultry Biology Fall and spring. Limited to graduated students. S-U grades only. Hours to be arranged. Staff.
A survey of recent literature and research in poultry biology.

610 Seminar Fall and spring. 1 credit. Required of all graduate students with a major or minor in animal sciences. S-U grades only.
M 11:50. Department faculty.

613 Forage Analysis Spring. 2 credits. Prerequisite: permission of instructor. S-U grades optional.
Chemical composition and nutritive evaluation of forage plants and related materials. The course includes a term paper summarizing results of independent laboratory study of either materials or methods.

619 Field of Nutrition Seminar Fall and spring. No credit. S-U grades only.
M 4:30. Current research in nutrition is presented by visitors and faculty.

620 Seminar in Animal Breeding Fall and spring. 1 credit. Limited to graduate students with a major or minor in animal breeding. S-U grades only. Hours to be arranged.
W 4:30. W. R. Butler and staff.
Current research in reproductive physiology is presented by staff members, graduate students, and visitors.

640 Special Topics in Animal Sciences Fall or spring. 1 or more credits. S-U grades optional. Hours to be arranged. Staff.
Study of topics in animal science more advanced than, or different from, other courses. Subject matter depends on interests of students and availability of staff.

720 Experimental Methods in Quantitative Genetics and Animal Breeding Spring. 3 credits. Prerequisites: matrix algebra, linear models, and mathematical statistics. S-U grades optional.
Hours to be arranged. R. L. Quaas.
Estimation of genetic and environmental parameters required to design efficient selection programs. Emphasis is given to interpretation of experimental and survey data with unequal subclass numbers, and prediction of genetic progress resulting from alternative selection methods.

Related Courses in Other Departments

726 Introductory Animal Physiology (Biological Sciences 311)
727 Introductory Animal Physiology Laboratory (Biological Sciences 319)
730 Milk Quality (Food Science 351)
735 Special Studies of Problems of Livestock Production in the Tropics (International Agriculture 602)
731 Lipids (Nutritional Sciences 602)
732 Basic Immunology, Lectures (Veterinary Medicine 315)
733 Basic Immunology, Laboratory (Veterinary Medicine 316)
734 The Population Biology of Health and Disease (Veterinary Medicine 330)
735 Health and Diseases of Animals (Veterinary Medicine 475)

Biological Sciences

The program of study in biology is offered by the Division of Biological Sciences. For course descriptions, see the section on the Division of Biological Sciences.

Communication

The middle and last digits of course numbers are used to denote specific areas:

00–09 Speech communication
10–19 Interpersonal communication
20–29 Mass communication
30–39 Visual communication and graphic design
40–49 Electronic media
50–59 Journalistic writing
60–66 Professional writing
67–69 Editing
70–79 Communication planning and strategy
80–89 Research methods and interdisciplinary courses
90–94 Special topics and seminars
95–99 Individualized study

101–109 Rhetorical Scholarship Lab Fall and spring. Maximum 1 credit per semester; may be repeated up to 6 credits in different labs. Limited to 20 communication majors or students with permission of instructor. S-U grades only.
Lec. hours to be arranged. P. Stepp, staff.

Students research and analyze contemporary issues to identify facts and derive the underlying values. Research will be used to write lines of argument, cases for debate, and speeches for public address, or to analyze pieces of literature to understand the author's intent. Analyses will be used to develop approaches to the oral presentation of the literature.

101 Debate: Affirmative Case
102 Debate: Value Objections
103 Debate: Briefs
104 Public Address: Persuasion
105 Public Address: Rhetorical Criticism
106 Public Address: Informative
107 Oral Interpretation: Prose
108 Oral Interpretation: Poetry
109 Oral Interpretation: Dramatic Duo

116 Theories of Human Communication Fall or summer. 3 credits. Not open to first-semester freshmen. S-U grades optional.
An introduction to human communication from a multidisciplinary perspective. Contributions from philosophy, psychology, neurology, social psychology, linguistics, anthropology, and communication theory are considered.

120 Introduction to Mass Media Fall or summer. 3 credits. S-U grades optional.
Fall, lecs, M W F 12:20. D. McDonald.
History, processes, philosophies, policies, and functions of United States communication media. Each major medium is examined individually in regard to information processing and persuasion. Effects of messages, regulation of media, and other contemporary issues are examined.

150 Writing for Media Fall, spring, or summer. 3 credits. Limited to communication majors—freshmen and transfers—fall and spring; open enrollment in summer.
Basic writing for print and broadcast. A back-to-basics approach to writing for clarity and style, using news and feature writing as a framework. Media form and style are analyzed. Weekly writing assignments, both in and outside of class, are given.

161 Writing in the Biological Sciences Fall or spring. 3 credits. Freshman Seminar designed for College of Agriculture and Life Sciences students.

201 Oral Communication Fall, spring, or summer. 3 credits. Each section limited to 24 students. Preference given to sophomores, juniors, and seniors. Students missing the first two class meetings without university excuse are dropped so others may register.
No student will be added or dropped after the second week of classes. Letter grades only.
Disc, MWF 8: M 9:05 and W 10:10; M W F 9:05; M 9:05 and W 10:10; MWF 10:10; M F 11:15 and W 12:20; W M 12:20; M 12:20 and W F 9:05; M 12:20 and W F 10:10; M F 12:20 and W 1:25; M W F 1:25; T R 9:05
203 Argumentation and Debate  Fall. 3 credits. Prerequisite: Communication 201. T R 12:20—1:45. P. Stepp. The student learns the principles of argumentation and the rules of debate. Classroom debates on the CEDA national topic will provide experience in critical thinking, rapid organization of thoughts, employment of and the rules of debate. Students give four graded speeches, write short papers, perform speaker evaluations, and engage in other speech-related activities.

204 Effective Listening  Fall, spring, or summer. 3 credits. Limited to 25 nonfreshman students. No add or drop allowed after the second week of classes. Letter grades only. Lec., M 1:25—2:40, lab, T or W 1:25—2:40. Evening, prelim. fall, November 12, spring, April 7. S. Warland. Listening seminars are used to present an analysis of the process of listening, to identify barriers to effective listening, and to teach techniques for improving listening, memory, attention span, note-taking, and other information-handling techniques. Topics from audiology, rhetoric, linguistics, intercultural communication, and the fine arts are also addressed. Students do frequent skill-building exercises in comprehension and retention.

205 Parliamentary Procedure  Fall or spring. 3 credits. Each section is limited to 50 nonfreshman students. No add or drop allowed after the second week of classes. Letter grades only. Lec., M 12:20; sec, T or R 2:30—4:25. R. D. Martin. A detailed study of the principles and rules of parliamentary procedure using Robert’s Rules of Order, newly revised, as the text. Emphasis on practical experience and the importance of a well-run meeting as an integral component of effective communication. Topics include: conventions, preparation of by-laws; and practice in serving as a presiding officer, secretary, and committee member in a simulated meeting situation.

230 Visual Communication  Fall. 3 credits. Limited to nonfreshmen and communication freshmen. Not recommended for design or art majors. Cost of project materials, $20—$30. Lec., T R 9:05; computer lab to be announced. C. Scherer.

A basic course in the use and importance of visual communication. Course focuses on objectives, audiences, and methods of visual production. Particular emphasis is placed on the visual communication of scientific and technical information. The laboratory concentrates on the use of computer for production of visual materials. Practical projects are assigned.

232 Art of Publication  Spring. 3 credits. Each lab limited to 30 nonfreshmen or seniors. Project materials cost $30—$50. Lecs., M W 1:25; lab, M W 2:30—4:25. Staff. A basic course designed to explore visual concepts that relate directly to communication. Projects include exercises in editorial design, layout, typography, and illustrations. Lectures, a field trip, in-class laboratory assignments, and outside projects examine opportunities and problems in publication design and production.

234 Photo Communication  Fall. 2 credits; summer, 2 credits plus 1 credit lab. Lab only limited to 25 students. A lecture course for those with limited experience in photography. Students are expected to supply their own cameras. Summer lab fee, $75. T R 10:15—12:25, S. Warland. Basic photography, photojournalism is emphasized during the latter part of the course. Summer session laboratory also includes film processing, projection printing, and photographic lighting.

250 Basic Newswriting for Newspapers  Fall or spring. 3 credits. Limited to 30 students. Prerequisite: major in communication or permission of instructor. Keyboarding proficiency essential. Lec., R 1:25—2:20; lab, R 2:30—4:25, plus out-of-class writing assignments. R. E. Shew.

Writing and analyzing news stories. A study of the elements used in newspapers in the United States. Two writing assignments each week, one in class, one done out of class.

272 Principles of Public Relations and Advertising  Spring. 3 credits. Limited to seniors and graduate students. Prerequisite: preference given to ALS students. Not open to freshmen. Lecs., M W F 1:25. C. Whittle.

Survey of the fields of public relations and advertising. Descriptions of organizations, jobs, and functions in the industry. The roles of public relations and advertising in society, the economic system, and organizations. Psychological and sociological principles as formulations for appeals. Strategies for media selection and message execution. Introduction to research and regulation.

301 Business and Professional Speaking  Fall or spring. 3 credits. Prerequisite: Communication 201. Lec., M 11:15; lab, T or R 10:10—12:05 or W 11:15—1:10. B. O. Earle.

The study and practice of oral communication skills used in organizations, including speeches, interviews, reporting, and discussions. It is expected that students will develop the analytical and presentation skills needed in business and professional careers.

314 Small-Group Communication  Spring. 3 credits. Limited to juniors and seniors. Prerequisite: Communication 116 or permission of instructor. T R 1:25—3:45. D. McDonald.

Exploration of the principles, values, and limitations of group discussion in democratic systems. Principles are put into practice in decision-making and problem-solving groups.

316 Rhetorical Theory  Fall. 3 credits. Limited to 20 communication majors. Prerequisite: Communication 116 and 201, or permission of instructor. M W F 1:25. R. Thompson.

Considers current views of rhetoric in historical perspective. Shows how assumptions about communication both shape the world view of the communicator and either aid or hinder the reaching of various communication goals. Treats historical figures briefly; focuses on contemporary thinkers such as Toulmin, Ong, Ehninger, Richards, Kuhn. Second half of course taught in seminar format.

342 Electronic Media  Fall. 3 credits. Limited to 30 communication majors. Prerequisites: Communication 120 and 150. Lec., T R 1:25; lab, R 2:30—4:25. T. Russo.

The techniques of audio and video message design and production. Emphasis is on scripting and recording audio and video public information programs. Students work on several projects from conception through production.

344 Radio Writing and Production  Fall. 3 credits. Limited to 30 communication majors. Prerequisites: Communication 342.


Scripting and recording various public information formats for possible use on local and state radio stations. Students create complete broadcasting plans and materials for public and private organizations.

346 Television Writing and Production  Spring (odd-numbered years). 3 credits. Limited to 30 communication majors. Prerequisite: Communication 342.

Lec., T R 1:25; lab, T 2:30—4:25. D. McDonald.

Television and video production. Students gain experience in studio and field production. Lectures concentrate on developing a sense of project planning and production aesthetics, lab concentration is on producing full-scale scripted news, entertainment, and public affairs programs from development of the idea through research, scripting, planning, and production.

348 Video Communication  Fall or summer. 3 credits. Prerequisites: Communication 116 and 230 and permission of instructor. R 1:25—4:25. S. White.

A course in nonlinear freelance writing for magazines. Intensive fact writing to help students communicate more effectively through the medium of the printed word in magazines. Art and writing techniques of good writing are studied; magazines in many fields of interest are reviewed. All articles are analyzed and returned to the student for rewrite and submit to a magazine.

350 Writing for Magazines  Fall or spring. 3 credits. Limited to 25 juniors, seniors, and graduate students, or others with permission of instructor. No drops after third week. Extensive out-of-class writing assignments. Fall or summer. 3 credits. Limited to nonfreshmen or graduate students per section. Prerequisite: Any college-level writing course. No drops after third week.

351 Radio Writing and Production  Fall or spring. 3 credits. Prerequisite: Communication 201. Lec., M 10:10; lab, R 11:15—1:25. S. White.

Writing for radio. Emphasis on media selection and message execution. Introduction to research and regulation.

352 Science Writing for the Mass Media  Fall. 3 credits. Not open to freshmen. Limited to 25 students. No drops after third week.

354 Print Media Laboratory  Fall. 3 credits. Limited to junior, senior, and graduate communication arts majors. Prerequisite: Communication 232, 250, or 350. R 1:25—4:25. J. E. Hardy and staff.

Writing, editing, and layout principles practiced in publishing the Cornell Comuntrman. Some additional outside work sessions may be required. Students will use microcomputers.

355 Print Media Laboratory  Spring. 3 credits. Limited to junior, senior, and graduate communication arts majors. Prerequisite: Communication 232, 250, or 350. R 1:25—4:25. J. E. Hardy and staff.

A continuation of Communication 354. Students will use microcomputers.

360 Scientific Writing for Public Information  Fall, spring, or summer. 3 credits. Limited to 25 nonfreshman or graduate students per section. Prerequisite: Any college-level writing course. Fall: lecs., M W F 9:05 (M. Long), T R 9:05 and W 11:15 (J. E. Hardy), T R 10:10 and W 12:20 (J. E. Hardy). Spring: M W F 9:05 (M. Long), T R 10:10 and W 12:20 (J. E. Hardy).
An intensive course in simplifying scientific and technical material for specific audiences within the general public. Weekly assignments include instructions, descriptions, explanations, and summaries in such formats as the newsletter, brochure, and report. Audience analysis will be emphasized. Not oriented to the mass media.

363 Organizational Writing  Fall, spring, or summer 3 credits. Limited to 25 junior, senior, or graduate students per section. Prerequisite: Any college-level writing course.


Students write as members of different organizations, in the position of supervisor, subordinate, colleague, and representative of business, government, community, and other organizations. Emphasis on adapting tone to the audience and purpose of the message. Weekly writing assignments include various kinds of internal and external reports, memoranda, proposals, and letters. Assignments based on case studies.

365 Writing in the Sciences and Engineering  Fall or spring 3 credits. Limited to 25 junior, senior or graduate students per section. Prerequisite: Any college-level writing course.

MWF 10:10; A. M. Wilkinson.

Students write scientific or technical material for colleagues in their own field. The objective is clear, concise writing, with attention to grammatical construction, usage, paragraph development, and organization. Weekly writing assignments include scientific or technical instructions, descriptions of equipment and procedures, definition and explanation of concepts, graphic presentations and discussion of data, abstract and summary, memorandum, research proposal, progress report, and research report.

368 Editing  Spring 3 credits. Limited to 25 junior, senior, or graduate students. Prerequisites: Communication 230, 250, 260, 360, or 365.

MWF 10-12:20, C. Glynn.

Students will follow the process that takes a manuscript from final draft to page proof. Emphasis will be on copy editing, proofreading, fitting copy, working with authors, making editorial decisions, and developing skill in critical reading. Appropriate for any student who expects to work with manuscripts or do editorial work.

372 Advanced Advertising  Spring 3 credits. Prerequisite: Communication 272 and communication or marketing major.


C. White.

A continuation of Communication 272. Examination of the qualitative and quantitative aspects of the mass media and how they are evaluated by advertisers. Function of media strategy in the marketing mix. Survey of advertising from the viewpoints of consumers. Introduction to research in advertising, with emphasis on identifying and predicting advertising effectiveness. Investigation into the planning, creation, and evaluation of advertisements and advertising campaigns.

375 Communication Planning and Strategy I  Spring, 3 credits. Limited to 35 juniors and seniors. Prerequisite: Communication 272 or permission of instructor.

MWF 10 10, C. Glynn.

Theories that guide and influence the solutions to public relations and public information problems in agriculture, business education, government, and social welfare organizations. Examination of the process of the formation of public opinion. Discussion of research techniques and communication tools used in communication planning, and fundamentals of developing a communication plan. Case studies and projects.

376 Communication Planning and Strategy II  Fall, 3 credits. Limited to 25 junior and senior communication majors. Prerequisite: Communication 375. Communication 382 strongly recommended.

Lec and lab, TR 10:10–11:40, C. Glynn.

A continuation of Communication 375. Focus is on the development and implementation of actual communication campaigns. Students work closely with a community organization in designing and implementing a communication program.

380 Independent Honors Research in Social Science  Fall or spring 1–6 credits. Limited to undergraduates who have met the requirements for the honors program. N. E. Awa.

382 Survey Research Methods  Fall or spring. 3 credits. Limited to 20 junior, senior or graduate communication majors; others by permission of instructor. Prerequisite: Communication 116 or 120 or permission of instructor.

Fall, M W 12:20, lab F 2:20–2:15, P. Yerbyrough.

MWF 11:15; lab F 11:15–1:10, R. Otsman.

Analysis of public opinion polls, market research, media audience ratings, readership surveys, and communication impact designs. Development of class research projects to be presented in final report. Instruction in computer use of Statistical Package for the Social Sciences (SPSS) to assist in data analysis. Familiarity with basic statistical concepts helpful.

410 Organizational Communication  Fall 3 credits. Labs limited to 20 junior, senior, or graduate communication students; others by permission of instructor. Prerequisite: Communication 116 or 120 or equivalent.

Lecs, M W 1:35; lab. F 11:40–12:02; 2:15, D. Schwartz.

Study of managerial communication practices in formal organizations, with an emphasis on communication between supervisor and subordinate; examination of the structure and function of planned and unplanned organizational communication networks. Case studies analyzed in lab.

416 Psychology of Communication  Fall. 3 credits. Prerequisite: Communication 116 or permission of instructor.

TR 10:10–11:30, N. E. Awa.

An advanced multidisciplinary study of communication theory. Topics include personal interaction, channels of communication, and effectiveness of messages. Study includes intensive analysis of major communication theorists.

418 Persuasion  Spring 3 credits. Prerequisite: Communication 116.

Lecs, M W F 11:15.

Staff.

The course concentrates on the analysis and understanding of the persuasion events around us. The assignments stress the application of various theories of persuasion to the interpersonal communication process. Students should have basic understanding of interpersonal communication theory.

420 Media Industries  Spring, even-numbered years 3 credits. Limited to communication majors.

Prerequisite: Communication 120 and 272.

T R 1:25–3:20, D. McDonald.

The workings and functions of mass media industries. Emphasis is placed on the structure of media industries, audience research, media economics, programming, and the organization of content production. For several projects, students will use microcomputers and work with data supplied by an audience research firm.

[421 Broadcast Media Laboratory  Fall 2 credits. Limited to junior and senior communication majors.

Prerequisite: Communication 344 or 346. Not offered 1987–88.

Emphasis on production of television and radio programs for various audiences. Course work is done primarily through individual tutorial arrangement.]


Hours to be arranged. A continuation of Communication 421.

428 Communication Law  Fall. 3 credits. Limited to junior, senior, and graduate students.

MWF 11: 15, D. A. Grossman.

A practical survey of the law governing mass media, primarily those working in the field. Coverage includes restraints on news gathering and publication, privacy, defamation, copyright, broadcast licensing, access, and other issues of current interest.

490 Special Topics in Communication  Fall, spring, or summer 1–3 credits variable. S—U grades optional. Prerequisite: permission of instructor.

Hours to be arranged. Staff.

Study of topics in communication not otherwise provided by a department course and determined by the interest of the faculty and students.

496 Internship  Fall, spring, or summer 1–3 credits. Students must apply to department internship committee no later than the spring prior to entrance period for a fall internship, or the fall prior to the enrollment period for a spring or summer internship. Prerequisites: communication junior or senior, 3.0 average in communication courses, and approval of committee. S—U grades only.

Lec, one-hour per week to be arranged. C. Whittle.

Structured, on-the-job learning experience under supervision of professionals in a cooperating organization. Students have a faculty course supervisor, who must be approved by the department internship committee. The faculty course supervisor awards the credit and grade (S—U only). A learning contract is written between the faculty supervisor and student, stating the conditions of the work assignment, supervision, and reporting. Minimum of 60 on-the-job hours per credit granted. May be repeated to a maximum of 6 credits.

497 Independent Study  Fall or spring 1–3 credits, variable, may be repeated to 6 credits with a different supervising faculty member. Prerequisite: 3.0 cumulative average (2.5 if teaching assistant for a skill development course) and permission of the faculty member who will supervise the work and assign the grade.

Staff.

Group or individual study under faculty supervision. Work should concentrate on locating, assimilating, synthesizing, and reporting existing knowledge on a selected topic. Attempts to implement this knowledge in a practical application are desirable.

498 Communication Teaching Experience  Fall or spring 1–3 credits, variable, may be repeated to 6 credits. Limited to juniors and seniors. Intended for undergraduates desiring classroom teaching experience. Prerequisite: 3.0 cumulative average (2.5 if teaching assistant for a skill development course) and permission of the faculty member who will supervise the work and assign the grade.

Hours to be arranged. Staff.

Periodic meetings with the instructor cover realization of course objectives, evaluation of teaching methods, and student feedback. In addition to aiding with the actual instruction, each student prepares a paper on some aspect of the course.

610 Organizational Communication  Spring 3 credits. Open to seniors.

TR 12:20–1:45, D. Schwartz.

Study of interpersonal communication systems in organizations. Methods for analyzing organizational and human communication effectiveness, including communication audits and network analysis.

611 Communication in Organizations  Fall 3 credits. Prerequisite: Communication 610 or permission of instructor.

Review of theories, research, and practical systems as they relate to human communication effectiveness in organizations. Includes components of interpersonal communication, intragroup and intergroup communication, communication processes involved in organizational goal setting, renewal, and change.

612 Intercultural and Development Communication Fall. 3 credits. T 1:25–4:30. N. E. Awa
A systematic analysis of sociocultural and psycholinguistic obstacles to effective communication between cultures, subcultures, and ethnic and identity groups. Also examined are the subtleties and complexities of nonverbal behavior in cross-cultural transactions. Examples are drawn from ethno linguistic and cross-cultural studies.

616 Interpersonal Communication Spring. 3 credits. Limited to graduate students in communication; others by permission of instructor. M W 10:10–12 N. E. Awa
A study of recent advances in interpersonal communication and social cognition. Theories and research in relational development. Human understanding of social events in an interpersonal context is explored.

620 Public Opinion and Communication Fall. 3 credits. Graduate students and advanced undergraduates. T 1:25–4:25. C. Gynn.
An examination of emerging communication patterns and systems and their contributions to the development process. Attention is given to the interaction between communication systems and national development in primarily agrarian societies.

A study of emerging technologies of communication, such as computer-based information systems and satellites and their potentials for influencing communication processes and social systems. Also examines the impacts of previous communication innovations from cave painting to television.

665 Scientific Writing for Scientists Fall and spring. 3 credits. Prerequisite: research in progress and permission of instructor. T R 8:30–9:55. A. M. Wilkinson.
Workshop for students with research in progress. Discussion and lectures on writing a journal article, thesis, report, and proposal; on objectives in scientific writing, relation of rhetoric and linguistics to scientific writing, process of publication and reviewing, and preparation of tables and illustrations; and on advanced and special problems in organization, paragraph development, sentence structure, and usage.

676 Communication Planning and Strategy Spring. 3 credits. Primarily for graduate students but open to seniors. T R 10:10–12. C. Scherer
Seminar in the planning of communication activities for the support of directed social-change programs. Examines communication and social theories, case studies, and planning models. Participants produce a comprehensive communication plan designed to solve a significant (real) communication problem of interest to them. Case studies and discussion focus on communication problems from nutrition and health, rural development programs, marketing, nonformal education programs, and corporate and government public information campaigns.

680 Studies in Communication Fall. 3 credits. Limited to graduate students in communication; others by permission of instructor. M 1:25–4:25. D. McDonald.
A review of classical and contemporary research in communication, including key concepts and areas of investigation. An exploration of the scope of the field and the interrelationships of its various branches.

682 Methods of Communication Research Fall. 3 credits. Limited to graduate students. M W 10:10–12. R. E. Ostman.
An analysis of the methods used in communication research. Emphasis is on understanding the rationale for experimental, descriptive (empirical and nonempirical), and historical-critical research methods.

Analysis, design, conduct, administration, and evaluation of training programs for the development of human resources in small-farm agriculture, rural health and nutrition, literacy and nonformal education, and general community development. Designed for scientists, administrators, educator-trainers, and social organizers in rural and agricultural development programs in the U.S. and abroad.

A departmental seminar for students and faculty on contemporary issues in communication.

792 Advanced Communication Studies Fall or spring. 3 credits. Limited to communication arts graduate students. May not be repeated. Students must use the faculty member’s section number to register.
Graduate faculty.
Independent studies and projects are carried out in conjunction with selected undergraduate courses.

798 Communication Teaching Laboratory Fall and spring. 1–3 credits each semester. May be repeated once. Limited to graduate students. Prerequisite: permission of the faculty member who will supervise the work and assign the grade. Students must use the faculty member’s section number to register.
Graduate faculty.
Designed primarily for graduate students who want experience in teaching communication courses. Students work with an instructor in developing course objectives and philosophy, planning, and teaching.

899 Directed Graduate Study Fall or spring. 3–6 credits. S-U grades only. Students must use the faculty member’s section number to register.
Graduate faculty.

Education


2010 Introduction to Applied Psychology: Learning and Memory Fall. 3 credits. Prerequisite: introductory psychology. M W F 10:10. J. A. Dunn.
This course deals with contemporary theories of learning, issues in the study of memory, and application of the principles of learning to the management of teaching and learning. Practical applications of research findings will be emphasized. One or more experimental projects and the use of microcomputers will be required. Not acceptable as a substitute for Education 311.

240 The Art of Teaching Fall and spring. 3 credits. Lec, T 2:30–4, labs to be arranged. G. J. Posner, H. L. Wardeberg.
This course is designed for all students interested in finding out more about teaching. Students engage in field experiences to find out what teaching involves (minimum of two hours a week). Possible field experiences range from large group to tutorial situations, from preschool to adult education, from traditional school subject matters to recreational and vocational areas, and from school-based to nonformal situations. Class and laboratory work builds on those experiences and provides skills and concepts to make the field experiences more profitable.

271 Sociology of Education Fall. 3 credits. S-U grades optional.
An introduction to the sociological study of schooling and education. Topics include the effects of social factors on educational achievement, the norms and values learned as part of the process of schooling, the relations between students and teachers, and the school’s relations to the economic and political systems. All levels of education, from elementary school to the university, are considered.

This course is an introduction to the social and behavioral science side of rural and agricultural development. Students will study human behavior as it occurs in typical interfaces between key groups like peasants and government officers, farmers and extension agents, rural female and male development workers, academicians and practitioners, administrators/supervisors and field workers, generalists and specialists, rural teachers and parents, merchants and farmers. A problem-solving approach will be used to the study of factors inhibiting human interaction and to design approaches for dealing with such factors.
301 Knowing and Learning in Science and Mathematics Fall. 3 credits. Prerequisites: Enrollment in the Teacher Education in Science and Mathematics Program. Letter grades only.

TR 9:05—10:10. J. D. Trumbull and staff.

Teacher education students in this course will tutor other university students to gain experience in eliciting learning and understanding of the concepts and ideas in science. Students will learn to design and carry out interventions to facilitate learning. The teacher education students will not only study how their tutees learn but will also evaluate and examine their own understanding about learning and knowledge in science and mathematics.

302 Observing and Interpreting Instruction in Science and Mathematics Spring. 3 credits. Prerequisite: Completion of Education 301 or permission of instructor. Letter grades only.


Teacher education students will observe in a variety of junior and senior high school classrooms to learn how a complete teaching episode conducted by a cooperating teacher and will plan and deliver a lesson to a small group of pupils. Planning and teaching work will be evaluated. By the end of the semester each teacher education student will consult with teacher education staff members and affiliates to decide about her or his continuation in the program.

311 Educational Psychology Fall or spring. 3 credits. Prerequisite: introductory psychology. S-U grades optional in fall; letter grade only in spring.


An introduction to statistical vocabulary and symbolism frequently used in reporting empirical research in education and other social sciences. Students are taught how to comprehend statistical terminology and results.

313 Introduction to Agricultural and Extension Education Fall. 3 credits. Prerequisite: permission of instructor.

Lec. M 2–4; 30; lab to be arranged. W. E. Drake and staff.

The course is intended for persons interested in careers as professional educators in agriculture. Investigates careers as a secondary school or two-year college teacher, cooperative extension agent, or educator in agriculture business and industry. The course emphasizes career information, methodology, and introductory teaching experiences. Class activities include presentations by resource persons currently in teaching and extension careers, field trips, and microteaching experiences.

332 Instructional Methods in Agricultural and Extension Education Spring. 3 credits. Prerequisite: permission of instructor.


The role of selected youth organizations in providing educational experiences for youth. Factors affecting membership, purposes, design, operation, and administration are surveyed. Emphasizing the roles an adult volunteer leader may play. The course is designed to give students an in-depth, learning-by-doing experience of how youth organizations function. Field experience with a recognized youth organization is required.

352 Reading Statistics Fall or spring. 1 credit. Prerequisite for spring: concurrent registration in Education 353.


An introduction to statistical vocabulary and symbolism frequently used in reporting empirical research in education and other social sciences. Students are taught how to comprehend statistical terminology and results.

353 Introduction to Educational Statistics Spring. 3 credits. Enrollment limited to 40 students.

Prerequisite: Education 352 or concurrent registration, or permission of instructor.


A study of common univariate and multivariate statistical procedures encountered in educational and psychological inquiry. Meaning of concepts and mastery of course content is emphasized; computational details are not. Microcomputers are used extensively in class to develop understanding of the properties of statistical indices.

370 Issues in Educational Policy Spring. 3 credits.


An examination of selected policy issues in current education. Included are such topics as equality of educational opportunity; student, parent, and teacher rights; and educational policies. Issues are treated from legal, sociological, and economic perspectives.

380 Independent Honors Research in Social Science Fall or spring. 1–6 credits. Limited to 3 credits.

Prerequisite: students who have met requirements for the honors program. S-U grades optional. A maximum of 6 credits may be earned in the honors program.

401 Our Physical Environment Fall or spring. 3 credits. Prerequisite: permission of instructor. Charge for photo supplies, approximately $7.

T 1–2, 1–5. V. N. Rockcastle.

A practical, relatively nonmathematical study of some basic relationships and physical interactions in the environment, with emphasis on physics and earth science. Attention is paid to analysis for understanding and techniques for teaching. A two-week session on photography and an individual research project are included. Useful for teachers and environmental educators.

402 Planning and Evaluating Instruction in Science and Mathematics Fall. 3 credits. Prerequisite: completion of Education 302 with a minimum grade of B, or permission of instructor.

TR 10:00–12:05. D. E. Hedlund.

Teacher education students will learn how to plan, implement, and evaluate whole class instruction units and will study and practice various student assessment techniques. For students in science teaching will include at least one laboratory exercise. Through consultation with teachers and administrators students will learn about school policies and procedures concerning sex- and substance-abuse education, and some effects of those policies and procedures.

403 Theoretical and Practical Analysis of Teaching Spring. 3 credits. Prerequisite: completion of Education 402, or permission of instructor.


The course will begin with a consideration and a critique of alternative approaches to teaching. Teacher education staff will prescribe individualized work for students, based upon their performances in their teaching in previous semesters. Students will further prepare for their forthcoming student teaching placements by consulting with their future supervising teachers. Enrollment in the course is limited to students working toward a New York State permanent teaching certificate. Graduate students enrolled in the course will be expected to complete a research project.

409 Undergraduate Secondary Science or Mathematics Student Teaching Spring. 12 credits.

Prerequisite: completion of Education 402 or permission of instructor.

Hours to be arranged. Staff.

Students will engage in supervised student teaching in science or mathematics at the secondary level. The program includes observation and teaching at a local school for a minimum of 8 weeks and attendance at a weekly seminar.

411 Introduction to Educational Measurement Fall. 3 credits.


Prerequisite: completion of Education 402, or permission of instructor.

Hours to be arranged. Staff.

Present students with the practical knowledge and skills necessary for success in the field of educational measurement. May be earned in the honors program.

413 Psychology of Human Interaction Fall. 3 credits.

TR 10:00–12:05. D. E. Hedlund.

Designed to develop skills for, and understanding of, effective interpersonal communication and interaction. Appropriate for students in the helping professions, education, and areas involving management of human resources.

414 Counseling Psychology Spring. 4 credits.

Limited to 30 students. Prerequisites: introductory psychology, social or personality psychology, and Education 413.

TR 10:00–12:05. D. E. Hedlund.

The processes of counseling are examined from various theoretical perspectives. Typical adult
400 Field Experience Fall or spring. 1–4 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the faculty member who will supervise the work and assign the grade.

Staff: Students may engage in planned, semiprofessional, or professional practice in an educational enterprise. Each student prepares a plan of action including rationale, purposes, and procedures and arranges with a faculty member to supervise and evaluate the field experience.

430 Special Problems in Agricultural Education Fall, or summer. 1–3 credits. S-U grades optional. Fall and summer: hours to be arranged; spring: T 8, H. R. Cushman.

An opportunity to study individually selected problems in agricultural education.

432 Teaching Agriculture: Methods, Materials, Practice Fall. 3 credits. Prerequisite: Education 332 and concurrent registration in Education 430 and 432. M T W R F 8–3. A. L. Berkey and staff.

Directed participation in teaching agriculture at the secondary-school level. Program includes a three-day intensive on-campus period and periodic seminars addressing selected methods and materials in teaching agriculture combined with a 14-week period in a student teaching center. Includes evaluation of area resources, instructional materials and facilities, planning and executing instruction, directing work experience, and advising youth organizations.

440 Adult Education Programs in Agriculture Fall: 3 credits. Prerequisite: concurrent registration in Education 430 and 432.

Lec to be arranged; H. D. Sulphin.

Determine instructional needs, planning programs of instruction, teaching in groups, giving on-the-job instruction, and evaluating adult, postsecondary, and extension education programs in agriculture.

445 Curriculum Design Fall. 3 credits. Education 644 may be taken concurrently.


A general practicum. Lec to course planning, Readings, group discussions, workshops, and individual conferences centering on each student’s project. This project consists of designing a course in a subject area for an age level and an institutional setting of the student’s choosing.

447 Instructional Applications of the Microcomputer Spring. 3 credits. R 3–4. (lab required); H. D. Sulphin.

The focus of the course is an introduction to microcomputer technology and the use of microcomputer technology in instruction and communication. Students select Modules A, B, and/or C. Module A addresses all the major application software packages, such as word processing, data base management, spreadsheets, communications, and instructional software. Module B is literacy development, introduction to programming, authoring languages, and computer systems. Students propose special projects for Module C. Hands-on instruction is given in all modules using the Apple Macintosh, IBM PC XT, and IBM PC.

472 Philosophy of Education Fall. 3 credits. K. A. Strike.

A study of central issues in the philosophy of education. Questions of ethics, political philosophy, and the theory of knowledge are examined and linked to current educational issues.

473 Contemporary Philosophy of Education Spring. 3 credits.

M W 11:15, plus additional work to be arranged. D. B. Gowin.

The emphasis in this course is the architeconics of meaning as a guide to philosophizing about education, our topic. We begin with the fact that philosophers disagree, as do experts in all fields. Every discipline exhibits competing philosophical principles. The appeal to facts to settle disagreements fails because some philosophical principle is necessary to give meaning to facts. Philosophy concerns itself with problems we can neither solve nor abandon. Each year the readings in the course will change as we seek to use texts that are the most up-to-date and also the most fundamental in philosophy. Thus, the course may be taken more than once. The curriculum is emergent.

477 Law and Educational Policy Fall. 3 credits. M 2:30–4:30. K. A. Strike.

A study of recent federal court decisions concerning education. Emphasis is given on examining legal issues against a background of related educational theory and in terms of the consequences of legal decisions for the development and operation of educational institutions.

478 Economics of Education Fall. 3 credits. S-U grades optional.

TR 10:10–12:05. R. L. Bruce.

An introduction to the use of economic principles to study education and educational policy. Attention is given to the impact of education on male-female and black-white earnings differentials, economic growth, the distribution of earnings, and characteristics of the labor force. The concept of human capital is introduced and developed as a means of understanding those phenomena. Techniques of cost-benefit and cost-effectiveness analysis are used to shed light on current controversies regarding the effectiveness of alternative types of schooling.

481 Educating for Community Action Spring. 3 credits. TR 10:10–12:05. R. L. Bruce.

The design and execution of educational aspects of community-action and nonformal education programs. Deals with the identification and statement of educational goals, selection of teaching strategies, and evaluation of outcomes.

482 Introduction to Adult Education (also Human Service Studies 411) Fall. 3 credits. Limited to 45 students. S-U grades optional.


Focuses on the broad aspects of adult education: scope and history of adult-education programs, philosophy and principles, perspective of the adult learner, media and methods of instruction, and program development. Opportunities are provided for observation of adult-education programs in community organizations and agencies.

483 Comparative Studies In Adult Education Spring. 3 credits. S-U grades optional. W 7:30—10:30 p.m. D. Deshler.

Focuses on the diversity of adult education programs in countries around the world. Literature on comparative adult education, international conferences on adult education, UNESCO adult education publications, and international community development are analyzed in relationship to each student’s exploration of adult education in two countries. Description of adult education in other countries is shared by international students.

497 Independent Study Fall or spring. 1–3 credits. S-U grades optional. Undergraduates must attach to their course enrollment material written permission from the faculty member who will supervise the work and assign the grade.

Staff: A student may, with approval of a faculty adviser, study a problem or topic not covered in a regular course or may undertake tutorial study of an independent nature in an area of educational interest.

498 Undergraduate Teaching Fall or spring. 1 or 2 credits; 4 credits maximum during undergraduate career. Limited to students with grade-point averages of at least 2.7. S-U grades optional.

Staff: Designed to consolidate students’ knowledge. Participating students assist in teaching a course allied with their education and experience. Students are expected to meet regularly with a discussion or laboratory section, to gain experience in teaching, and regularly to discuss teaching objectives, techniques, and subject matter with the professor in charge.

499 Undergraduate Research Fall or spring. 6 credits maximum during undergraduate career. Not open to students who have earned 6 or more undergraduate research credits elsewhere in the college. Limited to juniors and seniors with grade-point averages of at least 2.7.

Staff: Affords opportunities for students to carry out independent research under appropriate supervision. Each student is expected to review pertinent literature; prepare a project outline, conduct the research, and prepare a report.

547 Improvement of College Teaching Fall, spring, or summer. 2 credits. D. B. Gowin.

Concepts of teaching, learning, curriculum, and governance are used to guide practical activities that enhance faculty competence. Recent studies of concept mapping and learning, structure of knowledge, science teaching, adult learning, and evaluation provide a conceptual basis for improving teaching. Videotape techniques will be used to provide a basis for constructive analysis of teaching performance.

590 Special Topics in Education Fall, spring, or summer. 1–3 credits. Prerequisite: permission of instructor; S-U grades optional.

Hours to be arranged. Staff: Study of topics in education not otherwise provided by a department course. Designed for both current administrators and teachers and those entering the profession.

601 Secondary Science Teaching Practicum Fall or spring. 3 credits. Prerequisite: permission of instructor; Letter grades only. For graduate students enrolled in the Teacher Education in Science and Mathematics Program.


Supervised student teaching at a local school for a minimum of eight weeks and attendance at a weekly seminar.

602 Cumulating Work and Curriculum Development Spring. 3 credits. Prerequisite: Education 601.

Hours to be arranged. Staff: Students will develop, test, and evaluate course materials that they will be using in their teaching practice. Attention will be placed on producing quality units that integrate science from different disciplines and relate to the needs of various school subpopulations. Students will also evaluate the teacher education program and work on their culminating essays for completion of the master’s degree program. This course is open only to students enrolled in a permanent certification program.


Current research in mathematics education will be examined in order to develop a picture of the mathematics classroom that integrates subject matter, student conceptions, affective variables, and issues in the social context of learning mathematics. Special topics will include research on problem solving, women and mathematics, misconceptions, and research on teaching.
610 Seminar in Science and Mathematics Education Fall. 3 credits. Prerequisite: Education 210 or permission of instructor. M W 10:10–11. J. A. Dunn.

The course reviews the relevance of theories of learning and issues in the study of learning to the technology of instruction. Various examples of instructional systems will be considered. Student projects and laboratory exercises will be required. Education 210 will provide the necessary background for this course. Each student in 610 will work with two or three students in 210 in the design and execution of projects.

611 Psychology of Instructional System Design Fall. 3 credits. Prerequisite: Introductory psychology S-U grades optional. M W F 1:15-2:0 R. E. Ripple

A basic survey course for graduate students. Emphasis is on psychological factors involved in human learning and the educational process. Students are exposed to theory and research on psychological factors involved in learning, the learning process, and educational environments. Weekly seminars allow the students to become familiar with techniques for teaching and learning. The emphasis is on the design and development of instructional systems.

620 Internship in Education Fall or spring. 2–6 credits. S-U grades optional. Each student, before course enrollment, must obtain the approval of a faculty mentor who will assume responsibility for supervising the work. Staff.

An opportunity for practical experience in educational professions development.

630 Special Problems in Agricultural and Occupational Education Fall or spring, may also be offered in summer. 1–3 credits. S-U grades optional.

Hours to be arranged. A. L. Berkey and staff.

The course provides an opportunity for graduate-level study of individually selected problems and issues in agricultural and occupational education. Designed for experienced teachers.

632 Teaching Agricultural and Occupational Education Spring. 3 credits. Prerequisite: an introductory course in teaching methods or permission of instructor. M W 8:30–9:45. A. L. Berkey.

The focus of the course is on the selection, use, and evaluation of methods and materials for teaching agricultural subjects. Methods for group and laboratory instruction are covered. Opportunity is provided for students to develop and present teaching plans. Students will present their teaching plans on a field trip.


Current situations affecting agricultural education curricula are examined. Principles, objectives, and sources of information are developed for planning curricula. Strategies for developing occupational education courses are examined. Consideration is given to planning, developing, and managing work experience programs. Participants have an opportunity to observe ongoing programs at the secondary and two-year college levels and to pursue individual interests in curriculum improvement.

643 Structure of Knowledge and Curriculum Spring. 3 credits. Prerequisite: permission of instructor. M W 12:20–1:30. D. E. Hedlund.

Curriculum studies are the opening door to the four commonplaces of educating: curriculum, teaching, learning, and governance. A theory of educating explains the relations among these educational variables. Practice in concept mapping and Vee diagramming is required to achieve proficiency in curriculum analysis and curriculum construction. A theory and method for the analysis of the structure of knowledge is presented.

644 Curriculum Theory and Analysis Fall. 3 credits.


An examination of the basic elements involved in making curricular decisions. Emphasis is on an analysis of current approaches to curriculum. The course focuses on the differences between technical and critical perspectives on curriculum development, implementation, and evaluation. The major task of each student is to choose and conduct an in-depth analysis of a curriculum. This course is the basic graduate course in curriculum.

650 Methods of Educational Inquiry Fall or spring. 1–3 credits. Only unit a, for 1 credit, offered 1987–88. T R 2:30–4. J. Millman.

Techniques of empirical research are offered in three independent, but coordinated, modules: (a) survey of empirical approaches to social science inquiry, (b) design of educational research, and (c) methods of data collection. Course credit varies, depending upon the number of units the student elects. Units a, b, and c are covered during the first, second, and third thirds of the semester respectively.


Specific guidelines for preparing and writing a master's dissertation or doctoral dissertation are presented. Emphasis will be given to identifying a significant topic, conducting and describing a group miniresearch study, recognizing weaknesses in illustrative proposals, and clear and concise writing. Students will be provided ample assistance in constructing a brief thesis proposal of their own.


The course will consist of three modules, each for one hour of credit. (1) Evaluation as a programming function: fitting an evaluation to decision needs; program monitoring, evaluation and information systems. No prerequisite. (2) Evaluation models: comparative examination of various models and their implications for practice. No prerequisite. (3) Practicum in evaluation program: directed practice in the design and conduct of a "live" evaluation. Prerequisite: module 1.

659 Special Topics in Research Methods Spring. 2–3 credits. Prerequisite: permission of instructor. S-U grades only.

Hours to be arranged. J. Millman.

Consideration of new techniques and current topics in educational research design, measurement, or evaluation of programs, products, and personnel.

661 Administration of Educational Organizations Fall. 3 credits.


Perspectives on the administration of educational organizations. Considerations of social and ethical theories, and their application to both public schools and higher education. Intended for students who are considering careers as educational administrators, as well as for those who want to further their understanding of schools as organizations.

664 Educational Finance Fall. 3 credits. S-U grades optional.


An analysis of the distribution and utilization of public and private resources for educational purposes. The emphasis will revolve around the issues of equity, efficiency, and freedom of choice. Alternative methods of financing schools will be evaluated, and the perplexing legal and moral issues raised by such questions as "Who pays?" and "Who benefits?" will be discussed. Specific attention will be given to budgeting, accountability, and productivity. An opportunity for individuals to focus on their own areas of interest, such as occupational education, the two-year college, or secondary or higher education.

665 Administrative Decision Making Spring. 3 credits. S-U grades optional.


An introduction to alternative theories of decision making and their relevance to the field of educational administration. Emphasis will be placed on the analysis of decisions that exist at different levels of decision making within educational systems. Topics will include the impact of state and federal policy on educational organizations, collective bargaining, student decision making, and the dynamics of planned technological change.

673 Seminar in Dewey's Philosophy of Education Fall. 3 credits. S-U grades optional.


Dewey's corpus of philosophical works has been given new life by contemporary philosophers (Richard Rorty, Richard Bernstein, James Garvey, and Edward Watson). After fifty years or so of inattention, Dewey is now acknowledged as a "philosophic genius" of the twentieth century (along with Wittgenstein and Heidegger). Education and democracy are central to Dewey's thought; this seminar is an exploration of theory, method, and practical educative consequences of Dewey's views.

674 History of American Education Fall. 3 credits.


An examination of American schools, colleges, and universities from colonial beginnings to the present. An attempt is made to view education in the context of the evolution of American norms and values.
678 Planning Educational Systems  Spring 3 credits. S-U grades optional. T 2:30—4:30. D. H. Monk. A seminar focused on a comparative analysis of educational planning as it is practiced in both industrialized and developing nations. Topics will include manpower planning, the social demand approach to educational planning, benefit-cost analysis, and incentive models of planning. Attention will be given to case studies that will be selected in accordance with students' interests. The political and economic implications of attempts to plan education will be emphasized.

679 Policy Issues in Higher Education  Spring 3 credits. S-U grades optional. Offered alternate years. T 2:30—4:30. D. H. Monk. A seminar dealing with the planning, financing, and administration of higher educational organizations. Topics include a critical assessment of current approaches to macrolevel planning, as well as the analysis of special problems associated with the identification, selection, and institutionalization of particular types of colleges and universities.

680 Foundations of Extension Adult Education  Fall. 3 credits. Limited to 20 students. S-U grades optional. F 9:05—12:10. D. Deshler. An analysis of alternative purposes, nature, and scope of extension adult education, and continuing education programs in the United States and abroad, with emphasis on the relationship of programs to historical, cultural, political, and social settings. Definitions, conceptual controversies, philosophical issues, and current research directions will be examined through a seminar approach.

681 Designing Extension and Continuing Education Programs  Fall. 3 credits. Prerequisite: permission of instructor. T 1:25—4. R. L. Bruce. Designers' dilemma to understand the concepts, principles, and procedures relevant to developing programs and curricula for the continuing education of adults. Emphasis is on such key areas as the nature and role of programming, situation analysis and needs identification, planning, and program organization.

682 Community Education and Development  Fall. 3 credits. For students who have interest or experience in education or development programs in which community is an important concern. Not offered 1987—88. W 2:30—5. J. L. Compton. An examination of the concept of community; changes in community life; the analysis of community; alternative strategies for community development; patterns of response to community by universities, colleges, schools, cooperative extension, and government service agencies; and such functional dimensions of community education programming as participatory decision making, volunteers, leadership development, council formation and function, interagency coordination, and change-agent roles.

683 Administration of Nonformal Education  Spring. 3 credits. W 1:20—4. Staff. An overview of selected theories, principles, and strategies applicable to management of decentralized, professionally staffed, nonformal educational organizations and change agencies. Consideration is given to roles of community leadership, managerial leadership, management by objectives, and decision-making strategies. Particular attention is given to leadership of organizations with volunteer staff.

684 Adult Education Programs: Organization and Direction  Fall. 3 credits. F 1:25—4:20. H. R. Cushman. Alternative procedural models for organizing and conducting adult occupational education courses are presented. Guidelines and procedures for implementing the models in secondary and postsecondary school settings are emphasized.


690 Research Seminar  Fall or spring. No credit. M 4—5:30. Staff. Presentation of current research in the field of education by graduate students and staff. Opportunities to discuss methodology, findings, and other aspects of research.

711 Contemporary Issues in Educational Psychology  Spring. 3 credits. S-U grades optional. M W T 11:20—12:05, plus 1 hour to be arranged. J. A. Dunn. This is a graduate-level seminar dealing with contemporary issues in psychology having implications for educational practice and research. Each student will prepare and present at least one lecture per term. Topics will vary from year to year. Students may take the course more than once.

715 Seminar in Psychology and Education  Fall or spring. Variable credit. Prerequisite: permission of instructor. W 1:25—3:30. D. E. Hedlund. Selected topics focusing on the interaction of theoretical and research developments in psychology and education.

718 Adult Learning and Development  Spring. 3 credits. Prerequisite: permission of instructor. S-U grades optional. Offered alternate years. Hours to be arranged. R. E. Rippie, R. L. Bruce. Deals with adult development and learning behavior from points of view of educational psychology, social psychology, and sociology. Inferences are drawn from theory and research to the practical management of continuing education. Appropriate for graduate students in educational psychology, extension and continuing education, and community service education and for others interested in adult learning and development.

719 Seminar in Educational Psychology  Spring. 1 credit. W 12:20. Staff. Presentation and discussion of current professional topics in educational psychology. Current research and theoretical controversies in the field will be covered.

730 Seminar in Agricultural and Occupational Education  Spring. 2 credits. S-U grades optional. R 10:10. H. D. Sutphin and staff. For master's degree candidates who have had teaching experience and doctoral candidates with majors or minors in agricultural and occupational education. Emphasis is on current problems and research. Includes discussion and analysis of student research proposals.

735 Teacher Preparation in Agriculture  Fall. 3 credits. Prerequisite: teaching experience in agriculture. W 1:25—3:20. A. L. Berkeley. For persons with teaching experience interested in the preparation of occupational teachers. Involvement in the Cornell program of teacher preparation in agriculture is expected.

736 Occupational Education Program: Administration and Supervision  Spring. 3 credits. T 3:35—6; special sessions to be arranged. J. P. Bail. Practices and procedures of organizing, administering, and supervising programs of occupational education at the secondary and postsecondary level are stressed. The role of the director in providing leadership in improving instruction, designing programs, and using resources at federal, state, and local levels is considered.

739 Evaluating Programs in Occupational Education  Spring. 3 credits. T 1:25—3:20. labs to be arranged. W. E. Drake. This course examines objectives, criteria, and strategies for evaluating programs of occupational education in secondary and postsecondary schools. Evaluation models, case studies, and evaluation as a function of program planning are considered. Participants examine the roles of supervision in evaluation and have an opportunity to develop and apply evaluative instruments. Field trips and resource persons provide opportunities to observe actual evaluation problems and procedures.

745 Seminar in Curriculum Theory and Research  Spring. 3 credits. Prerequisite: Education 445 and 644, or permission of instructor. W 9:05—11:30. G. J. Posner. Theoretical issues in curriculum and appropriate areas for curriculum research are discussed.

750 Conceptual Problems in Educational Inquiry  Fall. 3 credits. S-U grades optional. R 1:20—3:10. D. B. Ciocca. A constructionist view (as opposed to the conventional foundationalist viewpoint) of creating knowledge and value claims is the starting point of this seminar. We will be concerned with the conceptual principles (both normative and scientific) that guide research such that knowing and valuing are integrated in research. A view of theory-driven programmatic research is presented. Emphasis is placed on research methods that will enable study of the past fifteen years at Cornell is expected. Copies are available in the libraries.

752 Organization and Management of Sponsored Research  Fall. 3 credits. S-U grades optional. Offered alternate years. Not offered 1987—88. M W T 11:20—12:05, plus 1 hour to be arranged. J. A. Dunn. Designed for doctoral students, advanced graduate students, and practicing researchers who have or expect to have responsibility for the promotion, management, or success of sponsored research and development or evaluation projects. The seminar is devoted to an in-depth review of the history of sponsored research, patterns of federal support, the federal procurement process, proposal preparation, research management, and futures analysis. Successful and unsuccessful proposals will be analyzed. Attention is given to alternative strategies for sponsored proposal development. This is not a thesis proposal seminar.

762 Research in Educational Administration  Spring. 3 credits. Prerequisite: one course in elementary statistics or permission of instructor. S-U grades only. Hours to be arranged. E. J. Haller. An analysis and critique of current research in educational administration. Discussion of research priorities and strategies in the conceptual area of educational governance. For graduate students interested in research on problems of educational administration. Students will carry out a small-scale empirical research project.

772 Seminar in Philosophy of Education  Spring. 3 credits. Prerequisite: Permission of instructor. S-U grades optional. Hours to be arranged. K. A. Strike. Topics to be announced.
Courses by Subject

Agriculture: 260, 262, 264
Behavior: 662
Ecology: 370, 455, 471, 664, 672
Introductory courses: 200, 212
Medical entomology and pathology: 452, 453, 454, 653
Morphy: 322
Pest management: 241, 342, 443, 444, 640, 677
Physiology and toxicology: 411, 483, 695, 690
Systematics and acarology: 331, 332, 621, 630, 631, 633, 634, 636, 674, 710

200 Cultural Entomology Fall. 2 credits. S-U grades optional. Intended for students in all colleges. Lecs, T R 11:15. E. M. Raffensperger.
A presentation of the insects, with attention to their roles in series and in civilization. Biological, historical, social, economic, and cultural aspects are discussed.

212 Insect Biology Fall. 3 credits. Prerequisite: Biological Sciences 101–102 (may be taken concurrently) or equivalent. Lecs, W F 11:15, lab, M T or W 2–4:25.
G. C. Eckwert.
Introduces the science of entomology by focusing on basic principles of systematics, morphology, physiology, behavior, and ecology of insects. The laboratory in early fall includes field trips to collect and study insects in the natural environment. A small collection emphasizing ecological and taxonomic categories is required.

241 Applied Entomology Spring. 3 credits. Prerequisite: Biological Sciences 101–102 or equivalent. Lecs, T R 10:10, lab, M T W or R 2–4:25.
E. M. Raffensperger.
A compendium of the insects associated with crops and farm animals. Discussions of insect pest management requirements on farm and in garden, along with descriptions of control methods, materials, and equipment.

260 Introductory Beekeeping Fall. 2 credits. Lecs, T R 11:15. R. A. Morse.
Introduces the fundamentals of practical beekeeping, including the life history, physiology, and behavior of honey bees. The classical experiments on the dance language and the role of pheromones are reviewed. Some lectures are devoted to pollination of agricultural crops and the production of honey and beeswax.

262 The Biology of the Honey Bee Fall. 1 credit. Limited to 10 students. Prerequisite: permission of instructor. Lab, afternoons or weekends to be arranged; course will meet in September and October only. R. A. Morse.
A series of laboratories in which students perform some of the classical experiments on honey bee behavior. Various techniques used in bee research are introduced.

264 Practical Beekeeping Fall. 1 credit. Limited to 20 students. Prerequisite: Entomology 260 (may be taken concurrently).
Lab. W or R 2–4:25. R. A. Morse.
This course consists of fourteen laboratory sessions to acquaint students with practical methods of colony management. Laboratories involve actual work with honey bee colonies and equipment. Some of the topics covered are management of bees for apple pollination, honey harvesting and processing, and disease identification and control.

322 Insect Morphology Fall. 5 credits. Prerequisite: Entomology 212 or 241. Offered alternate years. Not offered 1987–88.
Lecs, M W F 9:05; labs, M F 1:25–4:25.
G. C. Eckwert.
An introduction to the external and internal anatomy of insects, with emphasis on the comparative and functional aspects. The laboratory is devoted largely to dissection.

331 Introductory Insect Systematics Spring. 4 credits. Prerequisite: Entomology 212.
An introduction to the classification, evolutionary history, and distribution of the insects. Laboratory practice in the identification of orders, families, and representative genera of major groups of classification, preservation, and study. Lectures on theory and practice of insect systematics and major features of insect evolution. Insect collections are required.

332 Systematics Discussion Group Spring. 1 credit. Prerequisite: concurrent enrollment in Entomology 331 or permission of instructor. S-U grades only. Offered alternate years. Not offered 1987–88.
Disc, hours to be arranged. Q. D. Wheeler. 
Readings and discussion on topics in systematics coordinated with the lecture series in Entomology 331.

342 Special Topics in Economic Entomology Hours to be arranged. Staff.
Topics to be announced.

370 Pesticides and the Environment (also Toxicology 370) Fall. 2 credits. Prerequisites: Biological Sciences 101–102 or equivalent. Lecs, T R 9:05. J. G. Scott.
A survey of the different types of pesticides, their uses, and their effects on the environment. Discussion of the risks and benefits of pesticide use. For students whose main emphasis is not in pesticide usage.

411 Comparative Neuroendocrinology (also Biological Sciences 411) Fall. 3 credits.
Prerequisites: Biological Sciences 311 or Entomology 483.
A comparison of the interaction of the nervous and endocrine systems in vertebrates and invertebrates. Areas covered will include morphology, development, evolution, physiology, and molecular biology of neuroendocrine glands and their hormones.

441 Seminar in Insect Pest Management Spring. 1 credit. Limited to 10 students. Prerequisite: Entomology 241 or 444 or permission of instructor. S-U grades only.
Hours to be arranged. E. J. Bechinski, A. M. Shelton. Discussion of current topics in pest management, with an emphasis on insect pest management.

443 Pathology and Entomology of Trees and Shrubs (also Plant Pathology 443) Fall. 5 credits.
Prerequisites: Plant Pathology 301 and Entomology 241 or equivalent. Not offered 1987–88.
Lecs, M W F 10:10; labs, T R 1:25–4:25 or W F 1:25–4:25. Evening prelims. W. T. Johnson, G. W. Hudler. For students preparing for careers in horticulture, urban forestry, and pest management. Deals with the nature, diagnosis, assessment, and treatment of diseases and arthropod pests of trees and shrubs. Forest, shade, and ornamental plants are considered.

444 Integrated Pest Management (also Plant Pathology 444) Fall. 4 credits. Prerequisites: Biological Sciences 260 or 360, Entomology 212 or 241, and Plant Pathology 301 or their equivalents or permission of instructor.
Lecs, M W F 9:05; lab, M or W 1:25–4:25.
E. J. Bechinski.
Lectures integrate the principles of pest control, ecology, and economics in the management of pest-crop systems. Laboratories consist of exercises to reinforce concepts presented in lecture and demonstrate pest monitoring techniques and the application of computer technology to management problems.

452 Medical Entomology Fall. 3 credits. Prerequisite: Entomology 212 or permission of instructor. Offered alternate years. Not offered 1987–88.
A survey of arthropods of public health and veterinary
importance, with emphasis on transmission dynamics of pathogens, biomics of vector populations, and current control concepts. Morphology and taxonomy of selected groups are examined in the laboratory, with additional exercises in vector-pathogen relationships and epidemiological techniques.]

[453 Insect Pathology Spring. 4 credits. Prerequisites: Entomology 212 or 241 or permission of instructor. Recognizes the roles of microorganisms in insect pathology. Offered alternate years. Not offered 1987–88. Lecs, M W 10:10; lab, R 1:25–4:25. J. P. Kramer. A survey of the diseases of insects caused by viruses, bacteria, fungi, and protozoans and a consideration of the role of microorganisms in natural and applied insect control. Laboratory investigations center around living insect—pathogen associations and the consequences of these associations for both insect and microbe.

454 Insect Pathology Seminar Spring. 1 credit. Prerequisite: Entomology 453. S-U grades only. An introduction to the taxonomic, morphologic, and bionomic concepts, methods, and epizoological principles. Offered alternate years. Hours to be arranged. J. P. Kramer. Presentations, discussions, and analyses of current topics by the participants. Focus centers on microbial diseases of insects.

455 Insect Ecology, Lectures (also Biological Sciences 455) Fall. 3 credits. Prerequisites: Biological Sciences 211, Entomology 212 or their equivalents. Offered alternate years. Lecs, W 11:15 and 1 hour of discussion weekly to be arranged. R. R. Root. Ecological and evolutionary principles are integrated by thorough examination of outstanding investigations. Topics discussed include the factors responsible for the great diversity of insects, adaptive syndromes associated with climate, natural history of arthropod guilds, impact of insects on terrestrial vegetation, population regulation, and the contrast between natural and managed ecosystems.

471 Freshwater Invertebrate Ecology and Systematics Spring. 4 credits. Prerequisite: Entomology 212. Recommended: Biological Sciences 261 or 262, and 462 or 464. Lecs, T R 9:05; labs, T 1:25–4:25. One evening prelim. B. L. Peckarsky. The lecture explores the life histories, behavior, feeding ecology, and limitations to distributions of macroscopic freshwater invertebrates with an emphasis on insects. The laboratory involves field collections and laboratory identification of invertebrates and stresses the use of keys. Students may elect to conduct ecological field projects or to study the systematics of freshwater invertebrates in more depth.

483 Insect Physiology Spring. 4 credits. Prerequisite: Entomology 212 or permission of instructor. Lecs, M W F 11:15, lab, W 1:25–4:25. H. H. Hagedorn. An introduction to some of the often unique ways that insects have met their basic needs. Each organ system is examined with emphasis on basic principles and specific examples. The student will also be introduced to path common methods used in physiological research and to the critical reading of scientific literature.

497 Special Topics for Undergraduates Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work.

499 Undergraduate Research Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Undergraduates must attach to their course enrollment material written permission from the staff member who will supervise the work. Staff.

[621 Acrology Fall. 4 credits. Prerequisites: Entomology 212 and permission of instructor. Offered alternate years. Not offered 1987–88. Lecs, M W 9:05; labs, M W 1:25–4:25. G. C. Eckworth. An introduction to the taxonomic, morphologic, and bionomic of mites and ticks, with emphasis on taxa of economic importance. A collection is required.]

630 Field Entomology Spring. 2 credits. Prerequisites: Entomology 331 and permission of instructor. Offered alternate years. S-U grades optional. Hours to be arranged. J. K. Liebner, O. D. Wheeler. The course will be comprised of weekly meetings and an intensive two-week field trip. Evening meetings before the field trip will orient participants to chosen field sites, which will then be surveyed using advanced coleopterologist and coleopterist techniques. Material will be processed for inclusion in the Cornell University Insect Collection. Students will be responsible for food while traveling to and from the field sites.


634 Special Topics in Systematic Entomology Fall or spring; taught on demand. 2–4 credits. Prerequisite: permission of instructor. Hours to be arranged. Staff. Lectures on the classification, evolution, and biomics of selected taxa, with accompanying laboratory studies on identification and comparative morphology. Collections sometimes required.

636 Seminar in Systematic Entomology Fall or spring. 1 credit. Prerequisite: permission of instructor. S-U grades optional. Hours to be arranged. Staff. Public presentation of current systematic entomology topics to be announced, including current theoretical issues in insect classification, evolution, and biogeography.


653 Advanced Insect Pathology Fall. 3 credits. Prerequisite: Entomology 453, Microbiology 290, or permission of instructor. S-U grades optional. Hours to be arranged for lab and rec. D. W. Roberts. Special emphasis on the major diseases of insects caused by viruses, bacteria, fungi, protozoa, and nematodes. Emphasis will be on host-pathogen interactions, including at the cellular level. Also, molecular genetics and epizoological principles will be discussed. Laboratories will include practical aspects (such as bioassays) of working with each group.


664 Insect-Plant Interactions Seminar (also Biological Sciences 664) Spring. 2 credits. Limited to 15 students. Prerequisites: entomology, ecology, evolution, organic chemistry, and written permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88. Hours to be arranged. B. L. Peckarsky. Discussions and an intensive field course in the ecology of streams and lakes, including synthesis of key papers in the literature. Reports on personal research or ideas by students are encouraged.

674 Principles of Systematics (also Biological Sciences 674) Spring. 4 credits. Prerequisite: Entomology 331 or introductory systematics course in one of the field of biological sciences. Offered alternate years. Lecs-disc-labs, M W 1:25–4:25. Staff (O. D. Wheeler, coordinator).

An introduction to modern theories and methods of systematic biology. Lectures, readings, and discussions on theoretical systematics, including species concepts, classification, phylogenetics, and biogeography. Laboratories include various methods of analysis of data (e.g., cladistic hand and computer methods, numerical methods). Part of the grade is based on a final paper.

677 Biological Control Fall. 3 credits. Prerequisites: Entomology 212, Biological Sciences 261, and permission of instructor. Offered alternate years. Lecs, T R 9:05; lab, T 2:45–4:25. M. J. Tauber. Theory and method of biological control of arthropod pests and weeds. Laboratory includes studies with living parasitoids and predators.

685 Seminar in Insect Physiology Spring. 1 credit. S-U grades optional. Prerequisite: permission of instructor. Hours to be arranged. H. H. Hagedorn.

[690 Insect Toxicology and Insecticidal Chemistry (also Toxicology 690) Spring. 4 credits. Prerequisites: general chemistry and organic chemistry. Undergraduate students by permission of instructor. Offered alternate years. Not offered 1987–88. Lecs, M W F 9:05; lab, day to be arranged, 1:25–4:25. J. G. Scott. The chemistry of insecticides and their metabolism and mode of action in insects and mammals.

707 Special Topics for Graduate Students Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Not for thesis research. Staff.

708 Graduate Research Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Not for thesis research. Staff.

709 Graduate Research Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. Not for thesis research. Staff.
Floriculture and Ornamental Horticulture

Courses by Subject

Commercial floriculture crop production: 424, 425
Floral design: 105, 228
Freehand drawing and illustration: 109, 111, 210, 211, 214, 316, 417
Horticultural physiology: 401, 402, 601
Introductory course: 100
Landscape architecture (professionally accredited program): see the section "Landscape Architecture"
Landscape horticulture: FOH 475, Landscape Architecture 140, 205, 220, 310, 312, 345, 521, 522
Nursery management: 421
Plant materials: 212, 312, 313, 322, 342, 450
Retail floriculture: 105, 229, 325
Special topics in floriculture and ornamental horticulture: 497
Turfgrass management: 318

100 Introduction to Floriculture and Ornamental Horticulture Fall. 3 credits.
An introduction to commercial floriculture, landscape horticulture, and related horticultural professions and businesses. Emphasis is on the history, geography, and literature of the field, the structure and organization of the component industries, institutions and professions; and the role of science and technology in the continuing development of horticultural practice. A one-day field trip is taken to historic horticultural sites.

105 Floral Design: Introduction Fall or spring. 2 credits. Each studio is limited to 22 students.
Prerequisite: permission of instructor; preference given to plant science majors, then to students in education, design, and journalism. Charge to purchase instructional plant materials that the student will keep, $75. Enrolled students who do not attend the first session and fail to notify the secretary in 50 Plant Science Building of their absence will automatically be dropped.

T or R 1:25-4:25. C. C. Fischer.
A study of the established floral design techniques of this country, presenting the principles and the mechanics of the art to prepare the student to design for varying themes and occasions. Other aspects include selection, preparation, and factors affecting keeping quality of plant materials. Emphasizes the economical use of all supplies.

109 Nature Drawing Fall. 3 credits. Limited to 25 students. S-U grades optional.
M W F 10:10-12:05. R. J. Lambert.
A beginning course with emphasis on the drawing of natural forms: plants, animals, and landscapes. Of particular interest is the technique of observational drawing for various components of plant materials. Emphasis is given to the economic importance of taxa, to the basic mechanics of the art to prepare the student to design for outdoor situations, and to the elements of composition.

110 Freehand Drawing Fall or spring. 3 credits.
Each section limited to 25 students. S-U grades optional. Credit may not be received for both Floriculture 109 and 111.
Spring: permission of instructor required (registration must specify lecture hour and all studio hours). Lec, T 9:05-12:05, plus 5 additional studio hours to be scheduled in 2- or 3-hour blocks during M T W F R 9:05-12:20 and T 1:25-4:25. A. Elliot.
Developing accuracy of observation and a personal graphic vocabulary. Freehand perspective and its uses in establishing design and spatial relationships, practice in figure and landscape drawing, form vs. value drawing. Weekly outside sketchbook assignments.

210 Architectural Sketching in Watercolor Summer. 3 credits. S-U grades optional.
M T W F 11:30-12:45. R. J. Lambert.
Practice in outdoor sketching, primarily in watercolor, but including pen and ink, pencil, and colored pencil. Studio will develop working sketches into complete renderings. Principles of perspective are taught and applied. For any student who wishes to develop skill in handling watercolor. Outside-of-class sketchbook work required.

211 Freehand Drawing and Illustration Fall. 2 credits. Prerequisite: Floriculture 111 or equivalent. S-U grades optional.
6 studio hours scheduled in 2- or 3-hour units between 9:05 and 12:05 M T W R F. J. Lambert.
Progression to the organization of complete illustrations. Subject matter largely from sketchbooks, still life, and imagination. Composition, perspective, and ways of rendering in different media are considered.

Lecs, T R 9:05; lab, T 2-4:25 and W or F 2-4:25. R. G. Mower.
A study of the trees, shrubs, vines, and ground covers used in landscape plantings in the northeastern United States. Emphasis is on leaf identification and on characteristics that determine their usefulness as landscape subjects.

312 Garden and Interior Plants I Fall. 3 credits. Fee for lecture-laboratory manual, $20.
Lecs, T R 10:10; lab, T 2-4:25. R. G. Mower.
A study of ornamental plants used in garden and interior situations. The first seven weeks cover primarily herbaceous annuals and perennials, with the laboratory devoted to various practical gardening activities. The remainder of the semester covers the major kinds of foliage and flowering plants used in the home and other interior landscape situations. Emphasis is on identification, use, and general cultural requirements.

313 Woody Plant Materials for Landscape Use Fall. 3 credits. Limited to 30 students. Primarily for landscape architecture majors. Fee for lecture-laboratory manual, $20.
A study of the trees, shrubs, vines, and ground covers used in landscape plantings in the northeastern United States. Emphasis is on leaf identification and on characteristics that determine their usefulness as landscape subjects.

316 Advanced Drawing Fall or spring. 2 credits. Prerequisite: Floriculture 211 or permission of instructor. S-U grades optional.
6 hours to be arranged. A. Elliot or R. J. Lambert.
For students who wish to attain proficiency in a particular type of illustration or technique.

318 Turfgrass Management Fall. 2 credits. Prerequisite: permission of instructor. Hours to be arranged. A. M. Petrovic.
Study of the scientific principles involved in the management of golf courses, athletic fields, parks, industrial grounds, and sod production.

322 Garden and Interior Plants II Spring. 3 credits. Prerequisite: Floriculture 312 or permission of instructor. Fee for lecture-laboratory manual, $20.
A continuation of Floriculture 312. The first seven weeks are devoted to a further study of interior plants and the emphasis on specialized groups of interior plants such as orchids, cacti and succulents, gesneriads, ferns, palms, and bromeliads. The second seven weeks are devoted to outdoor herbaceous plants such as tulips, daffodils, crocus, and iris, as well as other spring-blooming bulbs and perennial plants. Outdoor laboratories emphasize practical gardening activities appropriate to the spring season.

325 Flower-Store Management Fall. 3 credits. Prerequisites: Floriculture 105 and permission of instructor. Laboratory materials charge, $50. Cost for field trips, $20 plus room and meals.
Lectures devoted to flower-shop management, business methods, merchandising, and marketing of floral and ornamental commodities. Laboratory includes application of subject matter and the principles of commercial floral arrangement and design. Required field trips made to flower shows and to wholesale and retail florist establishments.

[342 Taxonomy of Cultivated Plants (also Biological Sciences 342)] Spring. 4 credits. Not offered 1987-88.
Lecs, M W 10:10; labs, M W 2-4:25.
A study of ferns and seed plants, their relationships, and their classification into families and genera, emphasizing cultivated plants. Emphasis is on gaining proficiency in identifying distinguishing families and in preparing and using analytical keys. Attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.

401 Principles of Plant Propagation Fall. 3 credits. Prerequisite: Biological Sciences 242 and 244 or another course in plant physiology. A field-trip fee will be charged.
Lecs, T R 8; lab, R 1:25-4:25. L. Y. Mudrak.
Propagation of plants using vegetative techniques.
including cultivation, graftage, tissue culture, and propagation from seed. Physiological, environmental, and anatomical principles are stressed rather than hands-on techniques. Examples include horticultural, agronomic, and forestry crops.

402 Physiology of Horticultural Plants
Spring. 4 credits. Prerequisite: Biological Sciences 242 and 244, 341 or permission of instructor. M. W. F; lab to be arranged. F. B. Negm.
A study of the physiology of growth and development of horticultural plants in response to their environment.

417 Scientific Illustration
Fall. 2 credits. Prerequisite: Floriculture 211 or 316 or equivalent. S-U grades optional for graduate students only.
6 studio hours scheduled between 9:05 and 12:05 M. W. F. A. Elliott.
A survey of methods of illustration. Training in techniques of accurate representation in media suitable for reproduction processes, including pen and ink, scratchboard, wash, and mixed media.

421 Principles of Nursery-Crop Production
Fall. 4 credits. Prerequisite: Floriculture 401. Fee to cover supply costs associated with the course.
Lec., M. W. F 9:05, lab. R. 2-4:25. Field trips are included. G. L. Good.
Principles of commercial propagation and growth of nursery crops to marketable stage, including the postharvest handling of nursery stock. Some consideration is given to the planting and culture of landscape plants. Field trips are made to commercial nurseries.

424 Principles of Florist Crop Production
Spring. 4 credits. Offered 1988 and alternate years. Limited to 40 students. Preference given to juniors. Prerequisites: Floriculture 401 and Biological Sciences 242 and 244, or 342 (or may be taken concurrently), or equivalent, or permission of instructor. Cost for field trip and special laboratory supplies, $35.
A study of commercial production of florist crops with emphasis on their culture as influenced by greenhouse environment. Three field trips are made to commercial greenhouses.

425 Greenhouse Production Management
Spring. 4 credits. Primarily for seniors. Prerequisite: an elementary course in horticulture or equivalent. Cost of field trips, $150.
Lec., T R 10:10-12:05; lab, 3 hours to be scheduled. Two field trips. R. W. Langhans.
Intended to provide the latest information on efficient operation and management of a commercial greenhouse, outside the sphere of production methods for specific crops. Consideration is given to the industry, centers of production, competition, location, types of structures, heating, ventilation, cooling, fertilizing, watering systems, and business analysis and management.

450 Special Topics in Ornamental Plants
Fall or spring. Credit to be arranged. Primarily for upperclass floriculture and ornamental horticulture majors. Prerequisites: Floriculture 213, 312, 313, or the equivalent, and permission of instructor. Hours to be arranged. R. G. Mower.
Topical subjects in plant materials. Independent and group study of important groups of woody and herbaceous plant materials not considered in other courses. The topic is given in the supplementary announcement.

475 Landscape Management
Fall. 4 credits. Prerequisites: Floriculture 213 or 313 and Biological Sciences 241 or permission of instructor. Biological Sciences 242 and 244 are desirable but not required. Lec., M. W. F 10-11, lab. T 2:20-2:50 or 2:30-4:25. D. A. Rawok.
A study of the practices involved in the planting and maintenance of ornamental plants in the landscape. The two major emphases will be woody plants and turfgrass. The course will focus on the relationship between landscape design and management practices as well as on the physiological bases for and logistical considerations of essential management principles.

497 Independent Study in Floriculture and Ornamental Horticulture
Fall or spring. 1 or more credits; may be repeated for credit. S-U grades optional. Prerequisite: A student must satisfy the faculty member with whom he or she will work that his or her background warrants the choice of project. Undergraduates must attach to their course enrollment written permission from the faculty member who will supervise the work and grade the project. Faculty individual or small-group study and special projects in floriculture, ornamental horticulture, and related areas.

501/502 Master of Professional Studies (Agriculture) Project
Fall or spring. 1-6 credits. S-U grades optional. Hours to be arranged. Graduate Faculty.
A comprehensive project emphasizing the application of floricultural and ornamental horticultural principles and practices to professional horticultural teaching, extension, and research programs and situations. Required of Masters of Professional Studies (Agriculture) candidates in the field.

600 Seminar
Fall or spring. Open for credit to department graduate students. S-U grades only. R 12:20. Leader: N. L. Bassuk.

601 Current Topics in Floricultural and Ornamental Horticultural Physiology
Spring. Variable credit. Prerequisite: permission of instructor. Hours to be arranged. F. B. Negm.
Discussions of modern concepts, research, and commercial problems as reflected in current floricultural literature.

Landscape Architecture

100 Landscape Architecture Freshman Orientation
Fall. 1 credit. Limited to freshmen majors. S-U grades only. T 2-4. M. I. Adelman.
Introduction to resources supporting Landscape Architecture at Cornell.

*140 Landscape Design Studio
Spring. 4 credits. D. W. Krafl.

201 Theory and Application Studio
Fall. 6 credits. Limited to landscape architecture majors. Cost of basic drafting equipment and supplies, about $200; expenses for field trip, about $200. M. W. F 1:25-4:25. Required field trip. R. T. Trancik.
Basic design principles and process applied to the design of the outdoor environment. Studio projects focus on the analysis, organization, and form of outdoor space through the use of three-dimensional components including structures, vegetation, and earthform.

202 Project Design and Site-Planning Studio
Spring. 6 credits. Prerequisite: LA 201 with a grade of C or better. Cost of drafting supplies, about $100; basic expenses for field trip, about $300. M. W. F 1:25-4:25. Required field trip. R. T. Trancik.
A sequence of projects introducing students to advanced skills in spatial design and three-dimensional graphic representation, including perspective construction, rendering techniques in different media, value delineation, and the use of color.

301 Natural Systems Design Studio
Fall. 6 credits. D. W. Krafl.

302 Urban Landscape Systems Studio
Spring. 6 credits. Prerequisite: LA 301 with a grade of C or better. Cost of drafting supplies, about $100. M. W. F 1:25-4:25. L. Minn.
Projects in landscape architecture at the site scale as determined by constraints and opportunities of an urban environment. Emphasis on integration of site and historical analysis in formulation of physical design solutions.

310 Site Construction
Spring. 4 credits. Prerequisite: permission of instructor. Lec., M. W. F 9:05; studio, T 9:05-12:05. P. J. Trogolo.
Construction materials, specifications, cost estimates, and methods used by landscape architects in project implementation. The course includes construction demonstrations, lectures, studio problems, and construction documentation for a selected project.

312 Site Engineering for Landscape Architects
Spring. 4 credits. Prerequisite: Completion of LA 310 with a grade of C or better. Lec., M. W. F 9:05; studios, M. W. F 10:10-12:05. M. I. Adelman.
Lectures and studio projects focusing on the development of a working knowledge of site grading, earthwork, storm-water management, site irrigation, site layout, and road alignment.

*400 Professional Practice Seminar
Fall. 2 credits. D. W. Krafl.

401 Advanced Project Design and Graphics Studio
Fall. 6 credits. Prerequisite: LA 205 with a grade of C or better and LA 302 with a grade of C or better. Cost of supplies, about $100; basic expenses for field trip, about $300. M. W. F 1:25-4:25. Required field trip. R. T. Trancik.
A sequence of projects introducing students to advanced skills in spatial design and three-dimensional graphic representation, including perspective construction, rendering techniques in different media, value delineation, and the use of color.

402 Senior Project Studio
Spring. 6 credits. Prerequisite: Completion of LA 401 or the Denmark landscape architecture studio with a grade of C or better. Cost of supplies and reproductions, about $200. M. W. F 1:25-4:25. M. I. Adelman.
Site design and construction developed for a specific project as an evaluation of each student's professional competency in landscape architecture.

490 Special Topics in Landscape Architecture
Fall or spring. 1-3 credits; may be repeated for credit. S-U grades optional. Graduate Faculty.
Topical subjects in landscape architectural design, theory, history, or technology. Group study of topics not considered in other courses.

497 Independent Study in Landscape Architecture
Fall or spring. 1-5 credits; may be repeated for credit. S-U grades optional. Staff.
Work on special topics by individuals or small groups.

*500 Graduate Orientation Seminar
Fall. 1 credit. S-U grades only. D. W. Krafl.
*501 Theory and Application Studio  
Fall.  
6 credits. 
L. Minir.

*502 Project Design and Site-planning Studio  
Spring. 6 credits. 
D. W. Krall.

*520 Contemporary Issues in Landscape Architecture  
Fall. 2 credits. 
L. Minir.

*521 History of European Landscape Architecture  
Fall. 3 credits. 
L. Minir.

*522 History of American Landscape Architecture  
Spring. 3 credits. 
L. Minir.

531 Regional Landscape Planning I  
Fall. 4 credits. Prerequisite: permission of instructor. 
Lee, T R F 9:05 plus 1 hour to be arranged. 
A. S. Lieberman.
Landscape-ecology as a basis for regional landscape planning. Regional landscape planning strategies and methods that have been developed and employed in North America, Europe, Asia, and the Middle East. This course is intended to provide a base for understanding the utilization of landscape ecological knowledge in the planning process. It is presented through a series of lectures, readings, class discussions, exercises, and review of case studies. The course is directed to graduate students in landscape architecture, architecture, and regional planning, ecology, international studies, international agriculture and rural development, and natural resources.

532 Regional Landscape Planning II  
Spring. 3 credits. Prerequisite: permission of instructor. May be taken independently of LA 531. Not offered 1987–88. 
Lee, M W 9:05. Staff.
Vegetation analysis techniques and methods applied to comprehensive land-use planning and consideration of the environmental uses of plants in regional landscape planning. Landscape functions of vegetation at the regional scale reviewed in case studies in North America, Europe, the Middle East, and Australia.

601 Natural Systems and Planting Design Studio  
Fall. 6 credits. Limited to graduate students. Cost of drafting supplies, about $100; expenses for field trip, about $200. 
P. J. Trowbridge.
An application of design and planting methods within large physiographic or political units. Course participants will be engaged in the use of soil maps, aerial photographs, remote-sensed images, census data, and techniques for manipulating large, complex data bases.

602 Urban Systems Studio (also City and Regional Planning 555)  
Spring. 6 credits. Limited to graduate students. Cost of drafting supplies, about $100. 
P. J. Trowbridge.
Application of design and planning methods within large physiographic or political units. Course participants will be engaged in the use of soil maps, aerial photographs, remote-sensed images, census data, and techniques for manipulating large, complex data bases.

621 Summer Internship Seminar  
Fall. 2 credits. 
L. Minir.

634 Landscape Architectural Research  
Spring. 3 credits. 
An introduction to general research methods and to the diversity of landscape architectural research. Focus will be on practical, descriptive, qualitative, and archival methods as a bridge between the design professions and the traditional research professions.

650 Fieldwork or Workshop in Landscape Architecture  
Fall or spring. 2 credits. 
L. J. Minir.

690 Independent Study in Landscape Ecology and Regional Landscape Planning  
Fall. 1–3 credits. Limited to 7 students. Prerequisite: permission of instructor. 
S-U grades optional. 
A. S. Lieberman.
This course is designed to allow students who have taken LA 531 to engage in advanced readings and research in the human ecosystem science of landscape ecology. Also designed for other students who wish to gain familiarity with the conceptual and practical tools offered by landscape ecology. Open to graduate students in landscape architecture, city and regional planning, ecology, international studies, international agriculture and rural development, and natural resources. The course allows participants to engage in research or study leading to thesis preparation.

701 Advanced Project Design Studio  
Fall. 6 credits. Limited to graduate students. Cost of supplies, about $100; expenses for field trip, about $200. 
T. H. Johnson.
Advanced studio linking master planning and detail design processes while including diverse issues such as design research, project management, and environmental impact.

800 Master's Thesis in Landscape Architecture  
Fall or spring. 9 credits. 
Hours to be arranged. 
Staff.
Independent research, under faculty guidance, leading to the development of a comprehensive and defensible design or study related to the field of landscape architecture. Work is expected to be completed in final semester of residency.

Food Science  

210 Topics in Food Science  
Fall 2 credits. 
Prerequisite: Food Science 322 or permission of instructor. 
An interdisciplinary course designed for all undergraduate and graduate students in ALS that describes postharvest food losses and methods to reduce the loss. Topics include storage and care of unprocessed and minimally processed foods such as cereals, grains, fruits, vegetables, tubers, and fish. Biology and control of fungi, insects, and vertebrates in foods; chemical quality of foods; simple drying and storage practices; effects of climate; and economic and sociological factors affecting food preservation and storage. Emphasis is given to the problems in developing countries.

301 Nutritional Aspects of Raw and Processed Foods (also Nutritional Sciences 301)  
Spring. 3 credits. Prerequisites: Organic chemistry and Food Science 100 or Nutritional Sciences 110. 
An evaluation of factors affecting the nutritional quality of foods and diets. Nutritional quality is defined. Methods and approaches for assessing nutritional quality are presented. Factors that may alter nutritional quality of foods and food supplies (e.g., agricultural practices, processing, storage, cooking, government regulations, new technologies, fortification) are discussed.

304 Food Sanitation as Related to Public Health, Food Plant Processing, and Quality Assurance Programs  
Spring. 3 credits. Prerequisite: Food Science 100. 
Deals with measures essential in producing and processing wholesome and safe foods. Rules and regulations of the Food and Drug Administration, the U.S. Department of Agriculture, and other organizations important to the food industry are covered. Field trips and invited speakers are selected to demonstrate the use of sanitary principles.

311 Milk and Frozen Desserts  
Fall. 2 credits. Prerequisite: Food Science 322 or permission of instructor. 
Deals with the principles and practices of processing milk products and frozen desserts. The chemical, microbiological, and technological aspects of processing these dairy products are considered. Field trips to processing plants supplement the lectures and laboratory work.
A discussion of the sequence of events in developing research, and patents written reports.

With assistance of faculty members, students complete 400 Senior Seminar in Food Science and testing and control of food products, and practice in foods are studied systematically, with emphasis on the concentrations, drying, and freezing applied to foods. Current processing methods and their relations to the dairy products.

The course is an overview of quality control tests, basic chemistry, microbiology, and technology of raw materials and final products are discussed.

Focuses on the important aspects of farm sanitation and milk handling as they affect milk flavor and quality. The course is an overview of quality control tests, basic microbiology, cleaning and sanitizing, and special problems in manufacturing and marketing fresh and storable dairy products.

The major families of microorganisms of importance in foods are studied systematically, with emphasis on the roles of those organisms in food preservation, food fermentations, and public health.

Graduate students must have permission of the instructor.

Work includes study of the physiological characteristics of representative food microorganisms, practice in using general and special methods for microbiological testing and control of food products, and practice in isolation and characterizing organisms of importance in foods.

A series of lectures, demonstrations, and practical exercises. Includes, theoretical computation and objective results and establishing a quality-control program.

A discussion of the sequence of events in developing and marketing new food products. Topics include packaging and labeling, food additive and ingredient regulations, taste panels, market testing, market research, and patents.

A critical evaluation of humanity’s needs for food in the world and the international food technologies, organizations, and means to meet such needs. Novel extrusion, ultrafiltration, and fermentation food processes and basic nutrient foods for developing countries are described.

Prerequisites: Microbiology 290 and 291. Lab, M 12:20, lab, M 2–4:25. R. A. Ledford.

Field trips, laboratories, and demonstrations. Deals with the principles and practices related to managing, reducing, and reclaiming wastes from food plants and other unit operations important to the food industry. Selected types of methods used to conserve energy will be covered.

A series of lectures, demonstrations, and practical exercises. Includes, theoretical computation and objective results and establishing a quality-control program.

A critical evaluation of humanity’s needs for food in the world and the international food technologies, organizations, and means to meet such needs. Novel extrusion, ultrafiltration, and fermentation food processes and basic nutrient foods for developing countries are described.

A series of lectures, demonstrations, and practical exercises. Includes, theoretical computation and objective results and establishing a quality-control program.
supervise the work and assign the grade. Except for students enrolled in the honors program, credit will be limited to 4 credits total. Hours to be arranged. Staff. Independent study.

600 Seminar Fall or spring. 1 credit. Required of all food science graduate students. S-U grades only.

[601 Food Protein Chemistry Fall. 3 credits. Limited to graduate students and to seniors with permission of instructor. Prerequisite: Food Science 409 or equivalent. Not offered 1987–88. Lecs, M W F 10:10. J. M. Regenstein. The chemistry and physical chemistry of proteins are discussed critically with respect to current methods of characterizing and purifying proteins. Food protein functionality is emphasized.]

602 Computers in Food Laboratories Fall. 3 credits. Prerequisite: introductory physics. Lec, M 12:20; 2 labs per week, hours to be arranged. Staff. An introduction to computers as tools for data acquisition, process control, and data analysis in food science. Independently scheduled labs will teach basic analog and digital electronics, computer function and programming, data acquisition, use of computers for laboratory and industrial equipment, and the use of data analysis software. A background in computers or electronics is not required.

604 Chemistry of Dairy Products Fall. 2 credits. Limited to 16 students. Prerequisites: organic chemistry, biochemistry, knowledge of dairy-product manufacturing procedures, and permission of instructor. Offered alternate years. Not offered 1987–88. Lecs, F 1:25–3:30. D. M. Barbano. A detailed study of milk constituents and their properties. Properties of the major milk constituents are related to observed physical and chemical changes that occur in dairy products during and after processing. This course will emphasize current research in dairy chemistry.

605 Physical Chemistry of Food Components Fall. 3 credits. Offered alternate years. Not offered 1987–88. Lecs, M W F 10:10. J. W. Brady. This course will cover the physical properties of food molecules. Emphasis will be placed on the molecular basis of structural characteristics, colloidal properties, molecular interactions, foams, gels, and water binding of foods.

606 Instrumental Methods Fall. 3 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 1987–88. Lecs, M W F 8; lab, M 1:25–3:20, alternate weeks. J. W. Sherbon. Deals with instrumental methods widely used in research and industry. Includes chromatography, spectroscopy, electrophoresis, and thermal analysis. The stress is on the theoretical and practical aspects of the material presented. After the introduction, students will schedule laboratory time at their convenience.

607 Advanced Food Microbiology Spring. 3 credits. Prerequisite: Food microbiology genetics (preferred). Offered alternate years. M W F 11:15. C. A. Batt. The theory and application of genetic engineering for improvement of microorganisms used in the food and other industries will be addressed. Additionally, new methods for detecting microorganisms and their products by DNA-DNA hybridization, monoclonal antibodies, etc. will be discussed.

608 Food Color and Food Pigments Fall. 1 credit. Prerequisite: organic chemistry. Offered alternate years. Lec, F 11:15. J. P. VanBuren. A survey of chemical and physical properties of the major intrinsic food pigments and their stability during processing and storage. Chemical and physical origins of color. Food color as an indicator of other food qualities. Color and pigments of selected commodities are examined.

609 Rheology Fall. 1 credit. Offered alternate years. Not offered 1987–89. Lec, T 12:20. M. C. Bourne. Fundamental concepts of rheology applied to foods, with emphasis on objective methods for measuring textural properties. Principles and practice involved in measuring texture, viscosity, texture profiling, and consistency; instrumentation and correlations between objective and sensory methods of texture measurements. Examples of rheological problems in each major food group.

610 Introductory Chemical and Environmental Toxicology (also Toxicology 610) Fall. 3 credits. Prerequisites: biochemistry and animal physiology. Offered alternate years. Lecs, M W F 11:15. J. H. Hochkiss, C. F. Wilkinson, and staff. Introduction to the concepts and essentials of toxicology. The various biological responses to toxicants and the in vivo and in vitro methods of assessing toxicity, as well as the role of epidemiology, will be discussed. The chemical and biological factors that affect toxicity and specific sources of toxicants, including air pollution, agriculture, industrial processes, foods, naturally occurring toxicants, and social poisons will be presented. Regulation of toxic materials will be introduced.

615 Secondary Plant Metabolites in Foods Fall. 2 credits. Prerequisite: Biological Sciences 330 or 331. Offered alternate years. Not offered 1987–88. Lec, F 9:05. G. Hrazdina. Deals with the chemistry and biochemistry of secondary plant metabolites (chlorophyll, lignin, flavonoids, alkaloids, terpenes, carotenoids, steroids, and cyanogenic glycosides) and their importance to food products. Emphasis is on the chemical and biochemical properties of these compounds, their occurrence in edible plants, their reactions, and influence on food products.

620 Food Carbohydrates (also Nutritional Sciences 620) Spring. 2 credits. Limited to qualified seniors and graduate students. Prerequisite: Biological Sciences 330 or equivalent. Offered alternate years. Lecs, T 10:10. B. A. Lewis, J. W. Brady. A consideration of the chemistry of carbohydrates, including sugars, starches, pectins, hexosamines, gums, and other complex carbohydrates. Emphasis is on the intrinsic chemistry and functionality in food systems and the changes occurring during food processing and storage.


800 Research Fall or spring. Credit to be arranged. Limited to master's and doctoral candidates with permission of the graduate field member concerned. S-U grades only.

Related Courses in Other Departments

Marketing (Agricultural Economics 240)
Food Industry Management (Agricultural Economics 443)
Introduction to Agricultural Engineering and Computing (Agricultural Engineering 151)

Engineering Design and Analysis of Food Processing Equipment (Agricultural Engineering 468)
Meat and Meat Products (Animal Science 290)
Commercial Meat Processing (Animal Science 490)
Advanced General Microbiology Lectures (Microbiology 390)
Fundamentals of Postharvest Physiology: Handling and Storage of Horticultural Crops (Vegetable Crops 319)
Handling and Storage of Vegetables (Vegetable Crops 320)
Quality of Horticultural Crops during Marketing (Vegetable Crops 322)
Economic Fruits of the World (Pomology 208)

International Agriculture

300 Perspectives in International Agriculture and Rural Development Fall. 2 credits. S-U grades optional. F 1:25–3:20. E. C. Erickson, M. J. Wright. A forum to discuss both contemporary and future world food issues and the need for an integrated, multidisciplinary team approach in helping farmers and rural development planners adjust to the ever-changing food needs of the world.

402 Agriculture in Tropical America Fall. 2 credits. Prerequisite: upperclass or graduate standing. Letter grades only. F 1:25–3:20. H. D. Thurston and staff. A preparatory course for participation in International Agriculture 602. Physical resources, vegetation, history, crop and animal production, and various social and economic aspects of agriculture in tropical America will be discussed.

599 International Agriculture and Rural Development Project Paper Fall and spring. 1–6 credits. Limited to M.P.S. candidates in international agriculture and rural development. S-U grades only. Staff.

600 Seminar: International Agriculture Fall and spring. No credit. S-U grades only. Third and fourth W of each month, 4–5. Staff. The seminar focuses on developing an understanding of the nature and interrelatedness of agricultural development and the social sciences, plant and animal sciences, foods and nutrition, and natural resources.

602 Agriculture in the Developing Nations Spring. 3 credits. Prerequisites: International Agriculture 402 and permission of instructors. Cost of field-study trip includes return air fare and $350 for lodging, meals, and personal expenses. R 2:30–4:25. W. R. Hoffman and staff. Oriented to provide students an opportunity to observe agricultural development in a tropical environment and promote interdisciplinary exchange among staff and students. The two-week field-study trip during January to Latin America countries is followed by discussions and assignments dealing with problems in agriculture and livestock production in the context of social and economic conditions.

An intercollegiate course designed to provide graduate students with a multidisciplinary perspective on the administration of agricultural and rural development activities in developing countries. The course is oriented to students trained in agricultural and social sciences who are likely to occupy administrative roles during their professional careers.

604 Seminar on African Agriculture and Rural Development. Fall, 2 credits. S-U grades optional. M 12:55–2:30 F. W. Young. Strategies for increasing food production and raising rural incomes in Africa. Topics include cropping systems in Africa and the role of agricultural technology in increasing yields and improving livestock production; strategies for improving human nutrition; food storage and mechanization; rural employment projects; alternative development strategies; and experience with World Bank and other internationally funded rural development projects.

606 Farming Systems Research. Fall. 3 credits. S-U grades optional. T 3:30–4:25 R 12:30–1:25. R. Barker and staff. An interdisciplinary course focusing on the development of agricultural technologies and policies designed to assist small-scale farmers in developing countries. Techniques for gathering information, specifying research problems, and analyzing and interpreting data will be explored. The involvement of farmers in the research process is stressed.


695 International Nutrition, Agriculture, and Development (also Nutritional Sciences 695). Spring. 3 credits. S-U grades optional. W F 11:15–12:45. T. Brun and staff. A course concentrating on the major issues in food and nutrition policies as they relate to agriculture, including agricultural and nutritional decline. Lessons from socialist countries, the cash- versus food-crop debate, land reform, Green Revolution, and nutrition impact of agricultural programs. Emphasis will be placed on agricultural policies leading to growth with equity.

703 Seminar for Special Projects in Agricultural and Rural Development. Spring. 1 credit. Required for graduate students enrolled in the M.P.S. (Agr.) degree program and majoring in international agricultural and rural development; others with permission of the program director. S-U grades only. M 12:20 E. B. Oyer, L. W. Zuidema. The seminar provides students with the opportunity to present their special projects. It also serves as a forum for discussion of current issues in low-income agricultural and rural development, with particular attention to interdisciplinary complexities.

Related Courses in Other Departments
- Agricultural Economy and Development in Africa (Africana Studies and Research Center 400)
- Political Theory, Planning, and Development in Africa (Africana Studies and Research Center 500)
- Economics of Agricultural Geography (Agricultural Economics 150)
- Economics of Agricultural Development (Agricultural Economics 464)
- Food, Population, and Employment (Agricultural Economics 660)
- Macroeconomic Issues in Agricultural Development (Agricultural Economics 663)
- Microeconomic Issues in Agricultural Development (Agricultural Economics 664)

International Nutrition Problems, Policy, and Programs (Nutritional Sciences 680)
- Seminar in International Nutrition and Development Policy (Nutritional Sciences 695)
- Special Topics in International Nutrition (Nutritional Sciences 699)
- Plant Diseases in Tropical Agriculture (Plant Pathology 655)
- Economic Fruits of the World (Pomology 208)
- Rural Sociology and Agrarian Problems (Rural Sociology 205)
- Social Indicators and Data Management (Rural Sociology 213)
- Social Stratification (Rural Sociology 445)
- Contemporary Sociological Theories of Development (Rural Sociology 606)
- Social Organization of Agriculture (Rural Sociology 650)
- The Politics of Policy, Planning and Evaluation (Rural Sociology 675)
- [Design and Data Analysis in Development Research (Rural Sociology 715) Not offered 1987–88.]
- Sociotechnical Aspects of Irrigation (Rural Sociology 754, Agricultural Economics 754, and Agricultural Engineering 754)

64 Agriculture and Life Sciences

Landscape Architecture

The Landscape Architecture Program at Cornell is sponsored by the College of Agriculture and Life Sciences through the Department of Floriculture and Ornamental Horticulture and the College of Architecture, Art, and Planning. For course descriptions, see the listings under the Department of Floriculture and Ornamental Horticulture.

Microbiology


290 General Microbiology Lectures. Fall, spring, or summer. 3 credits. Prerequisites: Biological Sciences 101–110 and 103–104 and Chemistry 104 or 208. Recommended: concurrent registration in Microbiology 291.

M W F 9:05 (spring only) or 11:15. Three evening exams in spring. Fall, W. C. Ghiorse; spring, staff; summer, staff. A study of the basic principles and relationships in the field of microbiology, with fundamentals necessary for further work in the subject.

291 General Microbiology Laboratory. Fall or spring, 2 credits. Summer, 3 credits. Prerequisite: Microbiology 290 (may be taken concurrently). M W 2–3:30 or 7–9:30 p.m. (spring only), or T R 8–10:30, 11:15–1:45, or 2–4:25. Fall, W. C. Ghiorse; spring, staff. A study of the basic principles and techniques of laboratory practice in microbiology, and fundamentals necessary for further work in the subject.
Microbiology 65

731-738 Current Topics in Microbiology Fall, 731, 733, and 735; spring, 732, 734, and 736. ½ or 1 credit for each topic. May be repeated for credit. (Students registering for ½ credit should not fill in the credit-hour column on the optical-mark registration form; the computer is programmed to register students automatically for ½ credit.) Designed primarily for graduate students in microbiology. Prerequisite: upper-level courses in microbiology. S-U grades only. Hours to be arranged. Staff

Related Courses in Other Departments

Bioprocessing Applications in Agriculture (Agricultural Engineering 467)

Soil Microbiology (Agronomy 476)

Advanced Soil Microbiology (Agronomy 666)

Microbiology of the Rumen (Animal Science 607)

Microbial Genetics, Lectures (Biological Sciences 485)

Microbial Genetics, Laboratory (Biological Sciences 487)

Introduction to Bioprocess Engineering (Chemical Engineering 643)

Controlled Cultivation of Microbial Cells (Chemical Engineering 646)

Insect Pathology (Entomology 453)

Food Microbiology Lectures (Food Science 394)

Food Microbiology Laboratory (Food Science 395)

Food Mycology (Food Science 411)

Advanced Food Microbiology Lectures (Food Science 607)

Basic Immunology, Lectures (Veterinary Medicine 315 and Biological Sciences 305)

Basic Immunology, Laboratory (Veterinary Medicine 316 and Biological Sciences 307)

Pathogenic Microbiology (Veterinary Medicine 317)

Advanced Immunology, Lectures (Veterinary Medicine 705)

Advanced Immunology, Laboratory (Veterinary Medicine 706)

Advanced Work in Bacteriology, Virology, or Immunology (Veterinary Medicine 707)
Natural Resources


120 Agriculture and Wildlife

Spring. 3 credits. Lecs, M W F 11:15. A. N. Moen. A survey course for students in any year or major. Interactions between agriculture and wildlife in North America since 1800. Emphasis on agricultural impacts on wildlife, wildlife impacts on agricultural productivity and wildlife damage control, and policies and programs of agencies and other organizations that influence wildlife on agricultural lands.

200 Principles of Conservation

Fall. 3 credits. Limited to students specializing in natural resources. Not open to students who have passed Natural Resources 201. Lecs, M W F 10:10. 1-hour disc to be arranged. R. T. Ogle. The nature of natural resources, how they are managed, and their interactions with individuals and societies are considered. Case histories and demonstration of events illustrate both principles and practices. Emphasis will be on management of renewable resources based on an ecological perspective.

201 Environmental Conservation

Spring. 3 credits. Not open to students who have passed Natural Resources 200. Lecs, M W F 10:10. 1-hour disc to be arranged. T. J. Fahey. A survey course intended for students in any year and major. Designed to provide information and to stimulate ideas as an aid to understanding the major ideas as an aid to understanding the major aspects of environmental conservation and to grasp the pressures on natural ecosystems. All laboratory sessions in the field. One weekend field trip to the Adirondacks or other forest region.

303 Woodlot Management

Fall. 3 credits. Letter grades only. Lecs, T R 10:10; lab, R 12:20–4:25. J. W. Kelley. A practical, field-oriented course emphasizing multiple purpose management of small nonindustrial private forestland in the northeastern United States. Prerequisite: Natural Resources 200 or permission of instructor.

305 Maple Syrup Production

Spring. 2 credits. Limited to 20 students. Prerequisite: permission of instructor. Letter grades only. T 1:25–4:25 (preliminary seminars, followed by several half-days of fieldwork during the maple season). J. Kelley. Students work in two crews. Each crew is given the entire maple operation and learn modern sap-collecting techniques and quality control in making syrup.

308 Natural Resources Management

Fall. 3 credits. Prerequisite: Junior standing; introductory ecology or permission of instructor. Lecs, M W F 10:10. A. B. Knuth. Introduction to management of natural resources with a focus on fish, wildlife, and forest resources. Emphasis will be on formulating and achieving specific management goals and objectives. Concepts include historical overview; planning processes and the management cycle; biological, environmental, and human dimensions; jurisdiction, allocation, and ownership; decision making; and policy development.

400 International Environmental Issues

Fall. 3 credits. Limited to 30 students. Prerequisite: junior standing or approval of instructor. Lecs, M W F 12:20. R. J. McNeil. International aspects of the preservation and development of environmental and natural resources. Concepts include development, resource ownership, exploitation, compensation, and preservation. Cultural differences in attitudes and behaviors towards environment. Management practices under different cultural, economic, and social systems. Will cover current issues like acid precipitation; management of migratory whales, fish, and waterfowl; Antarctic development; global energy issues; and preservation of fragile and endangered resources. Lecture and discussion, term paper, and examinations.

406 Conducting Marine and Natural Resource Extension Programs

Spring. 3 credits. Lec and rec, T R 10:10. R. T. Ogle. Extension programs stimulate and help citizens use current research knowledge to reach decisions on the management of natural resources. The course provides an overview of the concepts used in this emerging natural resource field, and gives students experience in components important in conducting such efforts.

407 Religion, Ethics, and the Environment

Spring. 3 credits. For juniors, seniors, and graduate students; others by permission. S-U grades optional. T R 9:05–10:05. A. N. Moen. A study of how the humanities, especially religion, philosophy, and ethics, affect our understanding and treatment of nature. Historical overview followed by consideration of selected themes, including the structure of modern science, the meaning of the term nature, play and work, human finitude and death, and the seminar devoted to a discipline. Also responsibility to future generations; limiting growth and questions of distributive justice; world population and global hunger; and nuclear holocaust and the environment. Implications of environmental programs for minorities, the poor, and other nations; the meaning of the term public interest; land use (including the preservation of farmland); and energy policy.

410 Principles of Wildlife Management

Spring. 3 credits. Prerequisite: introductory biology. M W F 9:05. A. N. Moen. In-depth analyses of the ecological basis for decision making in wildlife management, with further considerations of sociological, economic, and legal factors. Computers are used for problem solving.

414 Selected Topics in Wildlife Resource Policy

Spring. 2 credits. Prerequisite: Natural Resources 410 or equivalent or permission of instructor. Cost of trips, no more than $20. T 1:25–4:25. Several field trips usually taken weekdays; one overnight field trip to Albany. H. B. Brumsted. A seminar devoted to analysis of selected current policy issues in wildlife management. Particular attention is given to citizen roles in policy development.

417 Wetland Resources

Summer, 1 week at Shoals. 1 credit. Not offered 1986–87. R. A. Malecki. For description, see listing under "Courses in Marine Science," in the section on the Division of Biological Sciences.

430 Dynamics of Animal Populations

Spring. 2 credits. For seniors and graduate students in natural resources, others by permission of instructor. Offered alternate years. Not offered 1987–88. T R 10:10. W. D. Youngs. A quantitative examination of the dynamics of animal populations. Interactive computing is used to assist in analysis and understanding of mortality, growth, population estimation, and population interaction.

438 Fishery Management

Spring. 3 credits. Prerequisite: Natural Resources 440 or permission of instructor. Offered 1987–88. Lecs, T R 8:30 plus discus. C. C. Krueger. Introduction to management as an adaptive process that focuses on achievement of goals. Coverage includes sport and commercial fisheries. Topics include setting goals and objectives, regulations, habitat management, population control, stocking, and management of trout, reservoirs, the Great Lakes, and Pacific halibut. Ecological, social, political, and economic aspects of those topics are discussed.
440 Fishery Science  Fall. 3 credits. For seniors majoring in fishery science; others by permission of instructor. Prerequisite: a year of statistics and calculus. Offered alternate years.

Principles and theories involved in dynamics of fish populations. Methods of obtaining and evaluating statistics of growth, population size, mortality, yield, and production are considered.

[442 Techniques in Fishery Science  Fall. 3 credits. Limited to 15 upperclass and graduate fishery students. Offered alternate years. Cost of field trips, no more than $30. Not offered 1987–88.
T R 1:25–4:25; 1 or more weekend field trips.
C. C. Krueger.

Emphasis is on methods of collecting data on attributes of fish populations and their habitat. Topics include passive and active fish-capture methods, tagging and marking, age and growth determination, food-habit studies, and physical and chemical habitat measurements. Several field trips provide hands-on experience in data collection on streams and lakes.]

493 Research in Policy and Human Studies in Natural Resource Management  Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. S-U grades optional.

494 Research in Fishery Science  Fall or spring. Credit to be arranged. S-U grades optional.

495 Research in Wildlife Science  Fall or spring. Credit to be arranged. Prerequisite: permission of instructor. S-U grades optional.

496 Research in Forestry Fall or spring. Credit to be arranged. S-U grades; letter grade by permission of instructor.
Hours to be arranged. T. J. Fahey, J. P. Lassoie, L. H. Weinstein.

500 Professional Projects—M.P.S.  Fall and spring. Credit to be arranged. Limited to graduate students working on professional master's projects. S-U grades only.
Staff.

601 Seminar on Selected Topics in Fishery Biology  Fall or spring. 1 credit. S-U grades optional.
Hours to be arranged. Staff.

602 Seminar in Natural Resources Analysis for Ecologically Based Planning  Spring. 2 credits. S-U grades only.
M 2:30. Staff.

Multidisciplinary graduate seminar. Theme changes each year but usually involves a case study of a specific area of land and water. Fieldwork usually required. Engineers, economists, sociologists, soil scientists, foresters, planners, and wildlife and fishery biologists are invited to bring expertise to the planning table.

603 Habitat Ecology  Spring. 2 or 3 credits. Limited to 12 seniors and graduate students majoring in natural resources or biological sciences. Prerequisite: permission of instructor. Cost of field trips, no more than $20.

This course requires an understanding of broad ecological concepts relative to plant-wildlife interactions. The concepts of niche, habitat, and ecoregion are addressed from the standpoint of island biogeographic principles, structural and spatial heterogeneity of the vegetation, community productivity, and temporal change. Major landforms and plant-animal communities of the northeastern United States will be discussed and visited during weekend field trips as shedding permits. Paper required for 3-credit option.

604 Seminar on Selected Topics in Resource Policy and Planning  Fall. 1 credit. S-U grades only.
Hours to be arranged. Staff.

Primarily for graduate students specializing in natural resources conservation.

606 Marine Resources Policies  Spring. 2 credits. Prerequisite: at least one related course such as Biological Sciences 364, 666, or 668, or Natural Resources 438, or permission of instructor. S-U grades optional. Not offered in 1987–88.

A seminar discussing the law and issues concerning current marine policy questions, such as coastal zone management, marine fish regulations, marine mammal protection, and wetland preservation.

607 Ecotoxicology  Spring. 3 credits. Prerequisites: graduate or senior status and two 300-level courses in chemistry, biochemistry, or toxicology.
Lecs, MWF 11: J. W. Gillett.

Lectures, readings, and special guest focus on the principles of effects of toxic chemicals on natural ecosystems, their components, and processes. Major topics include fate and transport of chemicals (chemodynamics), comparative biochemical toxicology, ecosystem process analysis, simulation through mathematical and physical (microcosm) models, and relationships to regulation and environmental management.

608 Policy, Planning, and Administration  Spring. 3 credits. Prerequisite: graduate standing; juniors and seniors with instructor's permission.

An examination, through lectures, readings, and discussions, of policy, planning, and administration relating to natural resource management in the public domain. Emphasis will be on concepts relevant to policy formulation, implementation, and evaluation with specific applications from fisheries, wildlife, outdoor recreation, and forest management. Topics will include bureaucracies and organizational effectiveness, professionalism and ethics, strategic and operational planning, problem-solving approachesincluding negotiation and dispute resolution, and decision aids such as benefit/cost analysis, risk assessment and management, and environmental scanning.

609 Effects of Ecological Perturbations on Fishes  Spring. 3 credits. Prerequisite: Biological Sciences 476 or permission of instructor. Cost of field trips, no more than $5.
Lecs, T R 11:15; lab, W 1:25–4:25; several field trips.
S. P. Gloss.

Impacts of habitat alteration and physical-chemical pollutants, with emphasis on freshwater and diadromous fish species of North America. Direct and indirect effects of a variety of industrial and land-use practices on fish and other aquatic organisms, with resultant changes in structure and function of fish communities due to lethal and sublethal responses are discussed. Laboratory includes several field trips.

610 Conservation Seminar  Fall and spring. No credit. All graduate students in natural resources are expected to participate.
Hours to be arranged. Staff.

611 Seminar in Environmental Values  Fall. 3 credits. For graduate students, juniors, and seniors. S-U grades optional. Cost of weekend trip, no more than $17.
W 1:25–3:50; 2 or 3 extra class sessions for presentations of papers and projects. Weekend trip in late September R. A. Baer or staff.

How the humanities, particularly religion, philosophy, and ethics, contribute to our understanding of agriculture and the environment. In successive years the seminar will focus on topics such as (1) land-use ethics, (2) the ethics of farmland preservation, (3) dealing with values and formulating resource policy in a pluralistic and democratic society, and (4) natural resource management and the concept of the public interest.

612 Wildlife Science Seminar  Fall and spring. 1 credit. Prerequisite: permission of instructor. S-U grades optional.
Hours to be arranged. Wildlife science faculty.

Discussion of individual research or current problems in wildlife science.

700 Ecotoxicologic Methods  Fall. 4 credits. Prerequisites: Toxicology 607 or 610, or permission of instructor.
J. W. Gillett.

Laboratory and field problems in bioassay, instrumental analysis, and field techniques demonstrate aspects of data quality control and assurance, interpretation, and utility in ecotoxicologic assessment. Standardization and test protocol development are emphasized. Work covers material from all media and microbiota, terrestrial and aquatic vertebrates, invertebrates, and plants.

800 Master's Thesis Research  Fall and spring. Credit to be arranged. Limited to graduate students working on master's thesis research. S-U grades only.
Staff.

900 Ph.D. Thesis Research  Fall and spring. Credit to be arranged. Limited to graduate students working on Ph.D. thesis research. S-U grades only.
Staff.

Related Courses in Other Departments
See department advisers and curriculum materials for information about other related courses.

Environmental Biology (Agriculture and Life Sciences 695)

Resource Economics (Agricultural Economics 250, 350, 450)
The Vertebrates (Biological Sciences 274)
Limnology (Biological Sciences 462)
Mammalogy (Biological Sciences 471)
Ornithology (Biological Sciences 475)
Biology of Fishes (Biological Sciences 476)
Insect Biology (Entomology 212)
Effects of Ecological Perturbations on Fishes (Environmental Toxicology 609)
Public Administration (City and Regional Planning 643)
Policy Analysis (City and Regional Planning 720)
Soil Science (Agronomy 260, 361)
International Development (City and Regional Planning 777, Government 428)
Environmental Planning Law (Law 660, City and Regional Planning 653, 656)
Political Economy and Political Theory (City and Regional Planning 719, Government 428)

Philosophy 381—Philosophy of Science
68 Agriculture and Life Sciences

Plant Breeding


Biometry courses are listed under "Statistics and Biochemistry."

225 Plant Genetics Spring. 4 credits. Prerequisite: one year of introductory biology or permission of instructor. Limited to 50 students.

Lecs, MWF 1-1:25, lab, T or W 1-1:25; lab section assignments at first lecture. Labs start first week.

M. A. Mutschler.

An overview of genetic principles is related to plant sciences. Mendelian inheritance and cell mechanics, DNA as genetic material, genetic fine structure and gene regulation, gene recombination, linkage and mapping, gene interaction, extranuclear inheritance, environmental effect on phenotypic expression, gene mutation and chromosomal aberration, variation in chromosome numbers, genes in populations, multiple gene inheritance, tissue culture, and genetic engineering. Students conduct an independent inheritance project focused on Brassica campestris. The course may not be used to fulfill the genetics requirement for students in the Division of Biological Sciences.

401 Plant Cell and Tissue Culture Laboratory Spring. 1 credit. Enrollment limited. Prerequisite: Plant Breeding 401 (may be taken concurrently) and written permission of instructor.

W 1-1:25-4:25 plus 1 hour to be arranged alternate weeks. E. D. Earle.

Laboratory exercises complementing Plant Breeding 401. Techniques for establishing, evaluating, and utilizing plant organ, cell, embryo, and other culture and the applications of those techniques to biological and agricultural studies. Current and proposed methods for plant improvement via manipulations of cultured cells will be discussed.

402 Plant Tissue Culture Laboratory Spring. 1 credit. Enrollment limited. Prerequisite: Plant Breeding 401 (may be taken concurrently) and written permission of instructor.

W 1-1:25-4:25 plus 1 hour to be arranged alternate weeks. E. D. Earle.

Laboratory exercises complementing Plant Breeding 401. Techniques for establishing, evaluating, and utilizing plant organ, cell, embryo, and other culture and the applications of those techniques to biological and agricultural studies. Current and proposed methods for plant improvement via manipulations of cultured cells will be discussed.

603 Methods of Plant Breeding Spring. 3 credits. Prerequisites: Biological Sciences 101-102, Biological Sciences 281 or Plant Breeding 225 or equivalent; and field crops, vegetable crops, floriculture, or pomology.

M WF 1-1:25, W, R. Coffman.

Breeding methods, systems, and operational procedures for producing commercial crop varieties are considered in detail, with emphasis on an integrated, interdisciplinary approach to major breeding objectives, including agronomic characteristics, quality characteristics, disease resistance, insect resistance, drought and flood tolerance, adverse soil tolerance, and adverse temperature tolerance.

604 Methods of Plant Breeding Laboratory Fall. 2 credits. Prerequisites: Plant Breeding 603 or equivalent.

T R 1-2:25-4:15, R. E. Anderson.

Field trips to public and private plant breeding programs. Discussion of breeding methods used, overall goals, selection and screening techniques, and variety and germ plasm release. Uses of computers in plant breeding research. Organization and presentation of a comprehensive breeding program on a chosen crop.

605 Physiological Genetics of Crop Plants Spring. 1 credit. Prerequisites: either genetics, biochemistry, and plant physiology, or permission of instructor. Offered alternate years.

T R 8-10, D. H. Wallace.

Both genetic and environmental influences on biochemical and molecular control of plant variation in physiological phenomena such as photosynthesis, respiration, translocation, self-incompatibility, maturity, yield, and heterosis are discussed. Emphasis is on variation that can be exploited in plant breeding, particularly in breeding for higher yield and adaptability.

622 Seminar Fall or spring. 1 credit. S-U grades only.

T 12:20. Staff and graduate students.


Designed for graduate students and advanced undergraduates. Current status of cooperative extension philosophy and methods. Developed for students interested in extension and research in public and commercial organizations.

Topics related to extension in other countries as well as in the United States.]

650 Special Problems in Research and Teaching Fall, spring, or summer. 1 or more credits by arrangement with instructor. Undergraduates must attach to their course enrollment material written permission of the staff member who will supervise the work and assign the grade.

Staff

653 Plant Molecular Genetics (also Biological Sciences 653) Spring. 3 credits. Prerequisites: Biological Sciences 261, and 330 or 331, or their equivalents.

Lecs, T R 10-11:30, S. D. Tanksley, M. R. Hanson, J. B. Nasrallah, P. Palukaitis.

A review of the organization, function, and evolution of genetic information in higher plants. An in-depth treatment of the organization of the chloroplast, mitochondrion, and nuclear genomes as well as their interactions. Current information on gene regulation in higher plants is also discussed.

716 Perspectives in Plant Breeding Strategies Spring. 3 credits. S-U grades optional. Prerequisite: Plant Breeding 603.

T 1:25-2:15, R 2:20-2:15, M. E. Sorrels.

Selection techniques and breeding objectives, methods, and strategies. Both self and cross-pollinated crops are reviewed and discussed. Extensive outside reading is required. Emphasis is on discussion and evaluation of selected benchmark papers and current literature.

717 Quantitative Aspects and Related Issues of Plant Breeding Spring. 3 credits. S-U grades optional. Prerequisite: Plant Breeding 603 and Statistics 601. S-U grades only.

T R 8:30-10 R. L. Plaisted, D. R. Viands.

Discussion of random-mating populations, inbreeding, components of variance, gene-pool development, heritability, population improvement, and other issues pertaining to breeding of cross-pollinated crops.

Plant Pathology


Lecs, T R 11:15, lab, M, W T 1:25-4:25; and one period weekly, scheduled at the convenience of the student.

An introduction to the theory and practice of plant pathology with emphasis on lectures in principles that govern interactions of plants and pathogens and in laboratories on diagnostic, life cycles of pathogens, and epidemiological phenomena and control. Specific aspects considered in detail include fungi, bacteria, nematodes, viruses, and mycoplasmas as plant pathogens; attack and resistance mechanisms; environmental influences; disease forecasting and loss assessment; development of resistant plants; and chemical and biological control.

309 Introductory Mycology Fall. 4 credits. Prerequisite: a year of biology or equivalent and permission of instructor.


An introduction to fungi, emphasizing biology and comparative morphology.

402 Plant Disease Control Spring. 3 credits. Prerequisite: Plant Pathology 301 or equivalent.

Lecs, T R 11:15, lab and rec, T W 1:25-4:25. Staff.

This course complements Plant Pathology 301 with an in-depth presentation of the principles and practices of plant disease control. Developed for students interested in extension and specific disease-control problem. The laboratories provide practical experience in diagnosis and disease-control techniques.

411 Plant Disease Diagnosis Fall. 3 credits. For senior undergraduates specializing in plant pathology or pest management and for graduate students with a major or minor in plant pathology or plant protection.

Prerequisite: Plant Pathology 212 or equivalent.

Lecs, M W 1-1:25, labs M W 2-1:25-4:25, G. W. Hudler.

Limited to 18 students. Offered alternate years.

[443 Pathology and Entomology of Trees and Shrubs (also Entomology 443)]. Fall. 5 credits.

Prerequisites: Plant Pathology 301 and Entomology 241 or equivalents.


For students preparing for careers in horticulture, urban forestry, and pest management. Deals with the nature, diagnosis, assessment, and treatment of diseases and anthropod pests of trees and shrubs. Forest, shade, and ornamental plants are considered.]

444 Integrated Pest Management (also Entomology 444). Fall. 4 credits. Prerequisites: Biological Sciences 261, Entomology 212 or 241, and Plant Pathology 301 or their equivalents or permission of instructor.

Lecs, MWF W 9:05; lab, M or W 1-1:25-4:25. E. J. Bechinski.

Lectures integrate the principles of pest control, ecology, and economics in the management of pest-crop systems. Laboratories consist of exercises to reinforce concepts presented in lecture and demonstrate pest monitoring techniques and the application of computer technology to management problems.

497 Special Topics Fall or spring. 1-5 credits. S-U grades optional.

Hours to be arranged.

An opportunity for independent study of a special topic in mycology or plant pathology under the direction of a faculty member.

498 Teaching Experience Fall or spring. 1-5 credits. S-U grades optional.

Hours to be arranged.

Undergraduate teaching assistance in a mycology or plant pathology course by mutual agreement with the instructor.
499 Undergraduate Research  Fall or spring. 3–5 credits. S-U grades optional. Hours to be arranged. Staff.
An opportunity for research experience under the direction of a faculty member.

641–655 Special Topics Series
Unless otherwise indicated, the following description applies to courses 641–655.
Fall or spring. 1 credit. Prerequisite: permission of instructor. S-U grades only.
Hours to be arranged.
Weekly discussions of current topics in special areas of plant pathology and mycology. Students are required to do extensive reading of current literature and to present oral and written reports.

641 Cytology of Plant Diseases
J. R. Alst, H. W. Israel.

642 Plant Disease Epidemiology
P. A. Arneson, W. E. Fry.

644 Soil-Borne Pathogens
G. S. Abawi.

645 Plant Virology
T. A. Zitter.

646 Plant Nematology

647 Bacterial Plant Diseases
S. V. Beer.

648 Molecular Plant Pathology
H. D. VanEtten, O. C. Yoder.

649 Mycology Conferences
Spring. 2 credits. Lec and lab. R. P. Korf. Chytridiomycetes, oomycetes, and zygomycetes.

650 Diseases of Vegetable Crops

651 Diseases of Fruit-Tree Crops
Fall. For graduate students and advanced undergraduates with a particular interest in fruit. Autoradiolysis slide and tape sets. P. A. Arneson. Covers the economic importance, causal agents, symptoms, disease cycle, and control measures for the major diseases of tree fruit in the Northeast.

652 Field Crop Pathology
G. C. Bergstrom.

653 Dendropathology
Spring. G. W. Hudler, W. A. Sinclair.

654 Diseases of Florist Crops
R. K. Horst.

655 Plant Diseases in Tropical Agriculture
Spring. H. D. Thurston.

681 Plant Pathology Seminar
Fall and spring. 1 credit. Required of all plant pathology majors. S-U grades only. T:4:30–5:30. Staff.

701 Concepts of Plant Pathology: Organismal Aspects
Spring. 3 credits. For graduate students with majors or minors in plant pathology; others by permission. Prerequisite: Plant Pathology 301 or equivalent and permission of instructor. Lecs. T R 9; lab-disc, R 2–4:25. S. V. Beer, O. C. Yoder.
Concepts in host-pathogen relationships with emphasis on roles of molecules and cells in determining the outcome of an interaction. Genetic, molecular biological, physiological, and cell biological approaches to experimental analysis will be considered. Historical perspectives and recent research will be reviewed and analyzed. Students prepare and review mock grant proposals.

702 Concepts of Plant Pathology: Population Aspects
Spring. 3 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: Plant Pathology 301 and permission of instructor. Lec. T R 8; lab. T 2–4:25. Staff.
Epidemiology of pathogens, disease assessment and losses, disease control and pest management, the role of modeling, and sociological aspects of plant pathology. The laboratory period will be used in part for exercises that illustrate concepts and in part for discussions.

705 Phytovirology
Spring. 2 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: Plant Pathology 301 or equivalent. Lec. T R 10:10. M. Zaitlin.
This course considers plant viruses and the diseases they cause. Consideration is given to virus structure and composition, classification, replication, effects on hosts, modes of transmission, and the relationships of these aspects to principles of diagnosis and control.

706 Phytonematology
Fall. 2 credits. For graduate students with a major or minor in plant pathology; others by permission. Prerequisite: Plant Pathology 301 or equivalent or permission of instructor. Lec. R 11:15; lab. R 1:25–4:25. M. P. Ko.
Deals with morphology, anatomy, biology, classification, ecology, detection and identification of plant pathogenic nematodes, evaluation of population data, interactions between nematodes and other plant pathogens, and methods of assessment of pathogenicity and plant damage.

709 Phytophymycology
Spring. 2 credits. For graduate students with a major or minor in mycology or plant pathology; others by permission. Prerequisite: Plant Pathology 301 and 309 or equivalents, and permission of instructor. Lec. F 1:25–2:30; lab. 2:30–4:30. J. W. Lorbeer.
Provides basic information on the biology of plant pathogenic fungi with selected emphasis on the structure, ecology, genetics, life cycles, and disease cycles of representative genera and species.

735 Advanced Plants Virology
Spring. 3 credits. Prerequisite: permission of instructors. 3 lecs. Rec. to be arranged. P. Patuikalis, M. Zaitlin. Topics in plant virology with an emphasis placed on student discussion of current literature. Topics included are viral infection process, viral and viroid replication, viral movement, viral genes and their products, cross protection, detection of viruses, and the use of viruses as vectors for introducing genetic material into plants.

738 Molecular Mechanisms of Pathogenesis
Fall. 2 credits. For graduate students with a special interest in molecular mechanisms of pathogenesis. Prerequisite: permission of instructor. S-U grades only. Not offered 1987–88. Hours to be arranged. H. D. VanEtten, O. C. Yoder, and staff.
This course deals with the molecular properties of both microorganisms and higher plants that control the development of host-parasite relationships. Contemporary molecular hypotheses are related to genetic mechanisms of pathogenesis. Emphasis is placed on a critical evaluation of the data that are used to support each specific hypothesis.

739 Advanced Mycology
Spring. 4 credits. Prerequisites: Plant Pathology 309 or equivalent, a course in genetics, and permission of instructor. Offered alternate years. Lec. M 10:10; labs. M W 1:25–4:25, and an additional 3-hour period to be arranged. R. P. Korf.
A detailed study of the taxonomy, nomenclature, and biology of two major groups of fungi (rusts and fungi imperfecti).

756 Advanced Plant Nematology
Fall. 3 credits. For graduate students with a major in plant pathology and special interest in nematology. Prerequisite: permission of instructor. Offered alternate years. Hours to be arranged. W. F. Mai, M. B. Harrison, M. P. Ko, B. B. Brodie.

797 Special Topics
Fall or spring. 1–5 credits. S-U grades optional. Hours to be arranged. Staff.
An opportunity for independent study of a special topic.

799 Graduate Research
Fall or spring. 1–5 credits. S-U grades optional. Hours to be arranged. Staff.

Pomology

100 Introductory Pomology
Fall or spring. 3 credits. S-U grades only for graduate students. Lecs. T R F 8; lab. T 2–4:25. One half-day field trip required. G. H. Oberly.
A study of the general principles and practices of fruit culture and their relation to the underlying sciences included are tree fruits, grapes, and small fruits. Topics covered include propagation, varieties, crop management, and growth and fruiting habits. Practical work is presented in grafting, pruning, site and soil selection, and planting.

208 Economic Fruits of the World
Spring. 3 credits. Prerequisite: introductory biology or permission of instructor. Offered alternate years. Lecs. M W 9:05; lab. W 2–4:25. Staff.
The more important subtropical and tropical fruits such as citrus, banana, pineapple, mango, coffee, and cacao are considered. Morphology, physiology, and adaptation to climate are stressed rather than details of culture. A broad view of world pomology is given.

302 Fruit-Tree Nursery Operation
Spring, first 4½ weeks. 1 credit. Prerequisite: Permission: Pomology 100 or permission of instructor. S-U grades optional. Offered alternate years. Lecs. M W 9:05; lab. W 2–4:25. Staff.
This course is intended to familiarize the fruit producer with the operations and problems of the fruit-tree nursery. Topics include production objectives, management decisions, and cultural aspects of nursery operation. Techniques of grafting, budding, pest identification, inspection, and grading of fruit-tree planting stocks are included.

304 Orchard Management I
A treatment of problems of concern to fruit growers, such as site selection, planting and pruning systems, water relations, cold hardiness, dormancy, flowering, and fruiting. Physiological and practical aspects are emphasized.

305 Orchard Management II
A continuation of the principles of pomology presented in Pomology 304. Subjects include the later stages of fruit maturation, quality harvesting, aspects of tree nutrition, protection from pests, and regulatory policies affecting fruit production and sale.
306 Small Fruits Spring, last 9 weeks. 2 credits. Prerequisite: Pomology 100 or permission of instructor. Offered alternate years.
A study of the evolution, breeding history, and biology of strawberries, raspberries, blueberries, and bushberries and of cultural practices used to maximize production. Emphasis will be placed on understanding how cultural practices influence growth, development, and fruitfulness and to protect these species from diseases and insects.

307 Viticulture Fall. 3 credits. Prerequisite: Pomology 100 or permission of instructor. Offered alternate years.
Lecs, T R 9:05; lab, R 2-4:25; Saturday field trips in early fall will replace several laboratory meetings. R. M. Pool.
Viticulture, with emphasis on the viticulture of the Great Lakes region, is presented as a series of interrelated decisions on varieties, sites, vine management, and vine protection. Those decisions are based on amelioration, meteorology, soils, vine and grape anatomy and physiology, as well as on the quality of the vine and grape from injuries, primarily from diseases and insects.

[311 Fruit Crop Systemsatics Fall, first 4½ weeks. 1 credit. Prerequisite: Pomology 100 or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987-88.
Lecs, T R 9:05; lab, R 2-4:25. G. H. Oberly.
The classification of fruit species is considered from a botanical and production viewpoint. The course deals with the identification and naming of fruit species and varieties and their botanical classification.]

[313 Utilization of Fruit Crops Fall, middle 4½ weeks. 1 credit. Prerequisite: Pomology 100 or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987-88.
Lecs, T R 9:05; lab, 1:25-3:55; two field trips, R 12:30-5:30. F. W. Liu.
A consideration of the fate of fruits produced for processing. The coverage of fruit products is generally limited to those commercially grown and processed in New York State. Although the discussion includes methods of canning, freezing, dehydration, and other types of processing, emphasis is placed on the quality requirement and proper handling of raw materials and how they affect the quality of end products.]

[315 Fruit Variety Improvement Fall, last 4½ weeks. 1 credit. Prerequisite: Pomology 100 or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987-88.
Lecs, T R 9:05; lab, R 2-4:25. Staff.
The techniques and limitations of producing new varieties of perennial fruit crops are considered.]

319 Fundamentals of Postharvest Physiology; Handling and Storage of Horticultural Crops (also Agricultural Engineering 319 and Vegetable Crops 319) Fall. 3 credits. Prerequisite: one horticultural course or permission of instructor.
J. R. Hicks, J. A. Bartsch.
The physiology—transpiration, respiration, ethylene synthesis and interactions, ripening, and senescence—of fruits, vegetables, flowers, and ornamental crops is studied. Environmental factors influencing the physiological process, thus affecting the quality and marketability of the products, are considered. The principles and methods of harvesting, cleaning, grading, packing, precooking, waxing, sanitation, and transportation of the products are studied. Storage methods, including common storage, refrigerated storage, controlled-atmosphere storage, and hypobaric storage, are discussed.

320 Commercial Harvesting, Handling, and Storage of Fruits Spring, first 3½ weeks. 1 credit. Prerequisite: Pomology 319, Vegetable Crops 319, or Agricultural Engineering 319. S-U grades optional.
Lecs, M W F 9:05; lab, 1:25-3:55. G. D. Blanpied.
Orchard factors influencing harvest maturity, quality, and storability of apples and methods of commercial harvest, handling, and storage for other important temperate climate fruits are studied.

400 Undergraduate Seminar Spring. 1 credit (may be taken twice for credit). Prerequisite: a course in pomology. S-U grades only. Hours to be arranged. Staff.
Seminar topics and speakers selected and arranged by the students on subject areas related to pomology.

[402 Special Topics in Experimental Pomology Spring. 3 credits. Open to undergraduates by permission. Offered alternate years. Not offered 1987-88.
Hours to be arranged. Staff.
Selected topics are considered with respect to the current literature or experimental techniques. Topics reflect the research interests of the professors who participate.]

602 Effective Horticultural Research Spring. 2 credits. Undergraduates admitted by permission of instructor. S-U grades optional. Offered alternate years.
Hours to be arranged. A. N. Lakso.
Methods of problem solving in research will be examined with emphasis on horticultural problems. Invited faculty and administrators will lead discussions on selected topics. Each student will be required to prepare a term paper and make an oral presentation on a grant proposal related to horticulture.

603 Current Topics in Postharvest Horticulture Fall or spring. 1 credit. Prerequisite: permission of instructor.
Hours to be arranged. G. D. Blanpied.
Graduate students and staff report and discuss current topics in postharvest biology and technology of horticultural crops.

604 Growth and Development of Woody Plants Spring. 2 credits. Prerequisite: introductory plant physiology. Offered alternate years.
T R 9:05. L. E. Powell.
An advanced course dealing with physiological, morphological, and biochemical changes during development, beginning with the seed and advancing through the mature reproductive plant. Hormonal control mechanisms are emphasized.

610 Research Fall or spring. 2 or more credits. Prerequisite: a course in advanced pomology. S-U grades optional. Undergraduates must attach to their grade report a signed permission from the staff member who will supervise the work and assign the grade.
Staff.

700 Graduate Seminar Fall. 1 credit. S-U grades only.
Hours to be arranged. Staff.
Reports by students on current research or literature in experimental pomology or related areas.

710 Teaching Experience Fall or spring. 1 credit. S-U grades only. Prerequisite: permission of instructor. Hours to be arranged. Staff.
Designed to acquaint pomology graduate students with the methods and materials involved in teaching. The student participates in the design, delivery, and evaluation of segments of a departmental course.

Related Courses in Another Department
General Horticulture (Vegetable Crops 103)
Handling and Marketing of Horticultural Crops (Vegetable Crops 322)
Advanced Postharvest Physiology (Vegetable Crops 612)

Poultry and Avian Sciences
The faculty members in the Department of Poultry and Avian Sciences are responsible for courses taught in several areas, including animal sciences, biological sciences, food science, and nutritional sciences. See the particular sections on those subjects for courses.

Rural Sociology
Note: Students seeking to fulfill their group C requirements may do so through several courses: Rural Sociology 101, 102, 205, and 208.

101 Introduction to Sociology: Social Structure and Quality of Life Fall, last 4'A.
Lecs, TR 10:10; disc, 1 hour in 160 Warren Hall, an ALS personal computer facility. M R F (See Sociology 101 as an alternative.) P R. Ebers and staff.
The course examines how various social factors influence people's well-being as individuals and as members of communities and societies. Social factors examined as causes of variations in well-being include age and life course, sexual identity, family and marital conditions, educational background, race and religion, occupation and the world of work, political participation and power structures, organizations and affiliations, population mobility, the post-industrial society, and more. Weekly discussion-laboratory sessions provide students with computing skills for analyzing the relative importance of those factors. The course concludes with considerations of how national, state, and local policies influence people's quality of life.

102 Introduction to Rural Sociology: Ecological and Sociocultural Perspectives Spring. 3 credits.
S-U grades optional.
Lecs, TR 10:10; disc, M or F 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30. T. A. Lyson.
This course provides a general introduction to the field of rural sociology. It is organized as a skills course as well as a survey course. The focus will be on giving students fundamental skills with which to decode the social world, including an understanding of the basic philosophical and theoretical underpinnings of the discipline and an exposure to the various types of data and methods sociologists use to describe and explain behavior. Special attention is paid to the agricultural sector and problems of rural development in the United States.

104 Proseminar: Issues and Problems in Rural Society Fall. 1 credit. S-U grades only.
R 12:20-1:25. Staff.
Introduces students to subject matter of concern to both applied and academic rural sociologists. Focuses on such subjects as migrant workers, agribusiness, rural poverty, rural-to-urban migration, rural development, agricultural research and people, community development, and small farmers in the less-developed nations. These topics are explored through the use of films and group discussion.

175 Issues in Contemporary American Indian Societies Spring. 3 credits.
M W F 11-15. Staff.
American Indian people are confronted with a myriad of special circumstances that impinge upon their everyday lives. The purpose of this course is to present background to these issues and give perspective from an American Indian point of view. Early history and the
postcontact period will be reviewed with an emphasis given to recent developments (1923–present). Topics such as land claims, treaties, education, mineral and water rights, social problems, militant organizations, and civil rights will be covered, with guest lecturers and media presentations giving added impact. 

205 Rural Sociology and Agrarian Problems
Spring. 3 credits.

An introduction to the analysis of some pressing social problems of contemporary Third World countries. Lectures and reading materials will present different approaches, analyses, and recommendations that follow from competing theories in order that students may determine which approach best explains the situation in Third World countries. Topics to be considered include visions of "development," the social organization of peasant communities and large-scale agricultural enterprises; problems of land tenure and agrarian reform; the relationships among population growth, hunger, and employment; multinational corporations; and social movements and social control.

[208 Appropriate Social Technologies Fall. 3 credits. Not offered 1987–88.]

The relationship between technology and society is among the most pervasive concerns of our time. Ultimately, what makes a technology "appropriate" is a sociological question. Lectures and readings review certain classical concerns regarding technology and apply those concerns to so-called appropriate technologies. The course attempts to show similarities and differences between high technology and appropriate technology, identify problems associated with technology transfer to and from foreign cultures, and add to the list of important criteria by which technologies are judged appropriate and inappropriate using numerous case studies.

213 Social Indicators and Data Management
M W F 11:15. F. H. Buttel.

A survey of definitions and measures of "social indicators." General principles of social-indicator research will be illustrated from data on both developed and less-developed countries in the areas of poverty and level of living, physical quality of life, inequality, and environmental problems. The course will examine measures based on census data, informant surveys, and household surveys, with an emphasis on simple and low-cost techniques. One-third of the course will be devoted to data management, using SPSS and microcomputers.

242 American Indian Philosophies I: Power and World Views (also Anthropology 242)
Fall. 3 credits. Enrollment limited to 20 students.

This course is designed to facilitate an understanding of the world views of American Indians of the past and present. The goal is to provoke edifying discourse that will enable American Indian beliefs concerning the workings of the universe and the relationship of human beings to nature to be understood on their own terms.

243 American Indian Philosophies II: Native Voices (also Anthropology 424)
Spring. 3 credits. Enrollment limited to 20 students.

An exploration of the diverse expressions of philosophy to be found in the words of American Indians. Novels, political treatises, speeches, autobiographies, and other sources reflecting Indian attitudes on a variety of subjects will be examined for beauty and power of expression as well as to identify recurring themes.

250 Farming as an Occupation
Spring. 1 credit.
R 12:20–1:25. Staff.

The occupation of farming will be examined through such topics as how farm and family tasks are coordinated, the most important decisions in farming, how a woman gets established in farming, what determines what can be done in a farm operation, how farm people retire, what constitutes success in farming, and how farming differs from other occupations.

301 Theories of Society (also Sociology 401)
Fall. 4 credits. Prerequisites: Rural Sociology 100 or 101, or Sociology 101. S-U grades optional. Not offered 1987–88.

A seminar for juniors, seniors, and beginning graduate students, especially in rural sociology and sociology. A survey of major theoretical approaches to the study of society and social institutions, with emphasis on (1) the central concepts of the sociological tradition, (2) major classical theorists (Maxim, Durkheim, Weber) and contemporary counterparts, and (3) application of the classical ideas in contemporary research. Applications of theories of society to current research and social problems will be stressed.

324 Environment and Society
Fall. 3 credits.
M W F 1:25. F. H. Buttel.

An exploration of various sociological approaches to the study of society and its physical environment and an analysis of major issues relating to the interaction of societies and their resource bases—particularly overpopulation, the energy and food crises, the limits-to-growth debate, the conduct of political struggles over energy and environmental policy, and the impacts of technological and social change in agriculture on environmental quality.

356 Rural Society in America
W 7:30–9:55 p.m. S. Saraydar.

A new awareness and image of rural America is examined. The population turnaround in the recent decades is evidence of new significance assigned to physical space, quality of life, and environmental protection for the future. The technological changes in American rural society are examined from sociological and historical perspective as a prelude to exploring future changes that might be expected for agriculture, the environment, and rural society.

367 American Indian Tribal Governments (also Anthropology 367)
Fall. 3 credits. Not offered 1987–88.
W 7:30–9:55 p.m. S. Saraydar.

This course focuses on the structure of contemporary tribal governments and the ways in which those governments are affected by, and affect, the economies and cultures of American Indians. The effects of European contact on traditional political organizations are discussed as are the present-day relationships of tribal governments to federal and state governments.

370 Social Structure of Industrial Change
Fall. 3 credits.
M W F 11:15. T. A. Lyson.

The course will show how changes in rural industry and consequent changes in rural communities and services are embedded in national changes in regions and industries. Research demonstrates that new rural industry is not resource converting or agricultural as in the past, but footloose, high technology, and for export. Industrial employment is mainly in branch plants of corporations. Consideration will be given to the regional context and change, the U.S. industrial structure, industrial location, corporate structure, multinationals and multinational, and social problems generated by industry in rural areas.

380 Independent Honors Research in Social Science
Fall and spring. 1–6 credits. Limited to students who have either completed the honors program or are preparing to do so. A maximum of 6 credits may be earned in the honors program.

Staff.

Students must submit written proposals by the third week of the semester of their senior year to the departmental honors committee representative, C. Geisler.

Rural Sociology 71

[405 Agriculture, Society, and Biotechnology (also Biology and Society 408)
Spring. 3 credits. Prerequisites: two courses in the social sciences and three courses in the biological or agricultural sciences. Not offered 1987–88.

An examination of socioeconomic aspects of biotechnology in the context of historical patterns of technological change in agriculture in developed and developing countries. The major topics covered include the social organization of biotechnology research, industry-university relationships, and the potential socioeconomic impacts of biotechnology on agriculture.]

425 Gender Relations and Social Transformation
Fall. 3 credits.

A comparative analysis of women's contribution to domestic/household and agricultural labor as productive processes and practices change. The course emphasizes the configuration of various economic, social, and political sectors and their realignments within countries in response to technology transfer, the transformation of the labor market, and changing family forms.

436 Small Towns in Metropolitan Society: Changing Structures and Quality of Life
Spring. 2–3 credits. S-U grades optional. Prerequisite: a social science course.

Small towns are experiencing a resurgence in attractiveness simultaneously with a transformation in their character. The course examines the effects of such long-range structural trends on quality of life in smaller communities. Analysis of data with personal computers is combined with theoretical explanations in examining the trends. Key analyses focus on causes and effects of the spread of new industrial and communication technology, population migration, family stresses, human service networks, educational attainment, local political budget strains, and personal happiness and satisfaction.

437 Aging: Issues in the 1980s
Summer, 3-week session. 3 credits.

An analysis of the "graying" of America and the responses of the public and private sectors to the demographic revolution. Examines the interplay between basic and applied knowledge in gerontology. Explores the formal and informal networks of services, in both rural and urban environments, that help maintain independent living arrangements by the elderly.

[440 The Social Impact of Rapid Resource Development

The seminar defines social-impact and assessment (SIA), places it in the context of contemporary theories of development, and identifies alternative SIA models. Focus is on the SIA experiences of various groups and constituencies, especially American Indians. Students will learn certain practical research skills needed in doing SIA and will participate in an SIA simulation exercise.]

442 American Indian Philosophies: Selected Topics (also Anthropology 422)
Fall. 4 credits. Prerequisite: Rural Sociology or Anthropology 242 or 243 and permission of instructor.
R 1:25–4:30; additional sessions to be arranged.
S. Saraydar.

This course provides an opportunity for students to pursue topics of interest from American Indian Philosophies I and II in greater depth. The specific topics to be investigated will be selected by the students in consultation with the instructor prior to the beginning of the semester.
T R 9:05–10:35. Staff.
Principal issues to be considered in the course include theories of rural stratification in primarily agricultural and advanced industrial societies; social organization of agricultural enterprises; interrelationships among market and nonmarket, agricultural and nonagricultural activities; and theories of change in stratification. Appropriate for majors in development sociology and international agriculture.

487 Informal Study Fall or spring. 3 credits (may be repeated for credit). Undergraduates must attach their course enrollment material written permission from the faculty member who will supervise the work and assign the grade. S-U grades optional.
Staff
Informal study may include a reading course, research experience, or public service experience.

606 Contemporary Sociological Theories of Development Fall. 3 credits.
M W F 11:15. F. W. Young.
A survey of social, political, and economic factors in retardation of regions and their implications for regional development. Theories and case studies from classical sociologists. Readings will cover topics connected to the explicit center on the interplay of economic, social-class, and political activities in locales.

First of a two-semester sequence (may be taken individually) in introductory graduate methods. Discusses problems of measurement, the design of instruments, and problems of reliability and validity. Common forms of measuring instruments are discussed. Students will develop hypotheses with an introduction to factor analysis. Students apply principles to development of several common types of scales. Computers will be used extensively.

The second part of the two-semester sequence in introductory graduate methods deals with principles of design, especially nonexperimental designs, with emphasis on an intermediate-level treatment of the following: analysis of variance, analysis of covariance, and causal models. Special emphasis is given to use of categorical variables in regression. Students develop and examine several analytical models to familiarize themselves with data handling and processing. Extensive use of computers.

W 7–10 p.m. C. C. Geisler.
The seminar acquaints students with the evolution of property rights, beginning in antiquity, and with the close association between changing property forms and community types as recognized by both classical and contemporary sociologists. Readings will cover subjects such as land reform, the changing public interest in land-use regulation, and the "new feudalism" debate.

M 12:20–2:15 plus 1 hour to be arranged. P. R. Eberts.
A survey of social, political, and economic factors in regional development. Theories and case studies from demography, human ecology, social organization, and planning are used to examine the emergence or retardation of regions and their implications for contemporary developing and developed societies.

Lec, F 2:20–4:30; disc to be arranged. P. R. Eberts.
A systems analysis of theoretical and research problems arising from localities' changing social organization. Major theories are examined with attention to their compatibility with modern policy analytic technique. Emphasis on case studies covered center on the interplay of economic, social-class, and political activities in locales.

Concentrates on a small number of significant commercial crops, examining the institutions and relationships involved in the production process: research, credit, distribution of inputs, the farm operation, processing, transportation, and marketing. Patterns in the farm and community level, including topics such as settlement, land tenure, ethnic groups, class structures, methods of cooperation, small farmers, labor problems, and information networks. Ecological and physical constraints on production. Emphasis on the need for national and international structures—political, social, and economic—on the production process, including the role of government and quasi-government units. Examines the historical circumstances that give rise to the present crop system. Consideration of what arrangements of the political, social, and economic structures, both domestic and international, are required for change in crop systems, improvement in production, and increased social welfare.

651 Structural Change in United States Agriculture Fall. 3 credits.
An analysis of the structural transformations of United States agriculture in the nineteenth and twentieth centuries, particularly the role of the state in agricultural development. This course emphasizes the historical roots of the socioeconomic problems of contemporary agriculture and examines the prospects for, and limitations of, various strategies for ameliorating those problems.

675 The Politics of Policy, Planning, and Evaluation Spring. 3 credits.
T R 1:25–3:30. Staff.
This course examines the structure and formation of national development priorities in Third World countries in the context of the internationalization and politicization of policy making agendas. Major topics considered are the role of international financial institutions, national fiscal and administrative crises, the international debt crisis, and the role of donor assistance in shaping national policy. Also addressed are the politics of policy making, planning strategies and evaluation, and the linkage between evaluation practices and policy reforms.

T 7–10 p.m. F. W. Young.
Reviews major issues concerning the relations between political and economic institutions, including the political-economic methodologies of the classical sociological theorists, the instrumentalist-structurist debate on the nature of the state, theories of crisis in advanced capitalism, and the controversies among theorists of unequal exchange, dependency, and imperialism in the world system.

712 Factor and Cluster Analysis, Multidimensional Scaling and Related Techniques Fall. 4 credits. Prerequisite: previous course work in scaling and statistics.
An advanced course in measurement and scaling, building from work by Thurstone Guttman and Coombs to multidimensional measurements. Topics include philosophy of factor analysis, factor analytic models, factoring design, factoring techniques, and comparison with factor analytic models. Cluster analysis, multidimensional scaling, and discriminate analyses are also discussed. As is more an integral part of these procedures, class time is devoted to that topic. Computers are used to analyze fit to models.

W 1:25–4:40. F. W. Young.
This seminar/practicum focuses on deriving valid conclusions from the data by the combination of theory, design, measurement, and statistical tests. Topics include a review of classical research design and alternatives to it, the varieties of data for development research, measurement, controls and contexts, and organizing the argument. Illustrations and exercises will cover a range of data types and problems: cross-national comparisons of central states, subnational comparisons of export agriculture for African and Latin American case studies of rural communities and other medium-size units, and household surveys of nutrition. Students will work through one or more computer-based exercises and therefore must know basic statistics and a statistical package. The term paper is a research proposal.

717 Regression and Path Analysis Spring. 4 credits. Prerequisite: two courses in statistics and one in methods.
The first part of the course reviews multiple regression theory and procedures, after which extensions of those models to categorical data are discussed. Consideration is given to violations of assumptions and their effects. The more-advanced regression concepts and techniques are discussed. The middle third of the course deals with recursive and nonrecursive path models. Time-series analysis is the last topic discussed. Computerized laboratories are an integral part of the course.

721 Ecological Perspectives on Social Change Spring. 3 credits.
Hours to be arranged. E. W. Coward, Jr.
Reviews major theoretical traditions in the analysis of societal-environmental relationships and applies these perspectives to public policy and development problems. The theoretical perspectives explored are drawn from human ecological and environmental sociology. Policy issues from developed and developing country settings are examined using ecological perspectives.

W 1:25–4. F. W. Young.
The seminar moves from a critical review of current explanatory formats (resource-mobilization, political-economy, structuralist) to a research practicum focused on ethnoregional movements, illustrating the possibilities of comparative research based on descriptive accounts. Those movements are associated with agricultural and industrial change, as well as shifts in the regional ethnic/class system.

W 1:30–4. C. C. Geisler.
Theories of community growth and decline and the current debate over the place of local control in community development in general are considered. Salient themes include the role of neopopulism in community development, changing institutions of property as community development occurs, and changing definitions of community.

[751] Applications of Sociology to Development Programs Fall. 3 credits. Not offered 1987–88.
R 1:25–4:45. E. C. Erickson.
A consideration of problems of implementing change strategies at national, regional, and institutional levels.
especially as they relate to rural development. Focus is also on institutional constraints on the sociologist as a researcher, as a strategist, and as a participant and on the different contexts within which developmental change occurs.

754 Sociotechnical Aspects of Irrigation (also Agricultural Economics 754 and Agricultural Engineering 754) Spring. 3 credits. S-U grades optional.


Examines irrigated agriculture and its relation to agricultural development. Emphasis on social processes within irrigation systems and interactions with the social setting. The seminar provides an opportunity to examine systematically the institutional and organizational policy issues associated with the design and operation of systems of irrigated agriculture.

771 Special Seminar Fall or spring. Credit to be arranged. Limited to graduate students; others by permission of instructor.

791 Teaching Experience Fall or spring.

1-3 credits. Limited to graduate students. S-U grades only.

Staff. Participation in the ongoing teaching program of the department.

792 Public Service Experience Fall or spring.

Credit to be arranged. Limited to graduate students. S-U grades optional.

Staff. Participation in the ongoing public service activities of the department.

871–874 Informal Study Fall or spring. Credit to be arranged. Limited to master's and doctoral degree candidates with permission of the graduate field member concerned. S-U grades optional.

871 Rural Sociology

872 Development Sociology

873 Organization Behavior and Social Action

874 Methods of Sociological Research

881 Research Fall or spring. Credit to be arranged. Limited to master's and doctoral degree candidates with permission of the graduate field member concerned. S-U grades optional.

Statistics and Biometry

C. E. McCulloch, chairman, N. S. Altman,
G. C. Casella, S. J. Schwager, S. R. Searle
Courses in statistics and biometry are offered by the Department of Plant Breeding and Biometry.

200 Statistics and the World We Live In

Spring. 3 credits.

Lecs, T R 10:10–11:25; disc, T 1:25 or 2:30; or W 10:10 or 1:25, or R 9:05. Prelims: weeks 6 and 11.

Staff.

Major concepts and approaches of statistics are presented at an introductory level. Three broad areas are covered: collecting data, organizing data, and drawing conclusions from data. Topics include sampling, statistical experimentation and design, measurement, tables, graphs, measures of center and spread, probability, the normal curve, confidence intervals, and statistical tests.

215 Introduction to Statistical Methods

Fall. 3 credits. Recommended: Statistics 200 for students with no prior experience in data collection and interpretation.

Lecs, M W F 11:15–15; lab, 1 hour to be arranged.

Statistical methods are developed and used to analyze data from the biological sciences. Topics include estimation, hypothesis testing, t-tests, analysis of variance, correlation, and simple and multiple regression analysis. Statistical computing is taught and used throughout the course. Emphasis is on proper use of statistical methodology and interpretation of statistical analyses.

408 Theory of Probability

Fall. 4 credits. Prerequisite: Mathematics 106, 108, or 112, or permission of instructor.


An introduction to probability theory: combinatorics, random variables and their probability distributions, generating functions, and limit theory. Biological and statistical applications are the focus. Can serve as either a one-semester introduction probability or as a foundation for a course in the theory of statistics.

409 Theory of Statistics

Spring. 4 credits. Prerequisite: Statistics 408 or equivalent.


The concepts developed in Statistics 408 are applied to provide an introduction to the classical theory of parametric statistical inference. Topics include sampling distributions, parameter estimation, hypothesis testing, and linear regression. Students seeking applied courses in statistical methodology should consider Statistics 401–402.

417 Matrix Algebra

Fall. 3 credits. Letter grades only. Prerequisite: precalculus mathematics.


Prelim 7:30–9:10 p.m., October 15.

Definitions, basic operations and arithmetic, determinants, and the inverse matrix. Rank, linear dependence, canonical forms, linear equations, generalized inverses and eigen roots and vectors. Emphasis is on understanding basic ideas and on developing skills for applying matrix algebra.

496 Statistical Consulting

Fall. 2 credits. Limited to undergraduates. Prerequisites: Statistics 409 and 602 and permission of instructor. S-U grades only.

Lecs, W 1:25–2:15 plus one hour of consulting to be arranged.

Staff. Participation in the Biometrics Unit consulting service: faculty-supervised statistical consulting with researchers from other disciplines. Discussion sessions for joint consideration of selected consultations encountered during previous weeks.

498 Supervised Teaching

Spring. 2 credits.

Limited to statistics and biometry undergraduates. S-U grades only.

Staff.

Students assist in teaching a course appropriate to their previous training. Students will meet with a discussion or laboratory section and regularly discuss objectives with the professor in charge of the course.

499 Undergraduate Research

Fall or spring. Credit to be arranged. Limited to statistics and biometry undergraduates. Prerequisite: permission of faculty member directing research.

Staff.

600 Statistics Seminar

Fall or spring. 1 credit. S-U grades only.

W 3–4:30. Staff.

601 Statistical Methods I

Fall. 4 credits. Limited to graduate students, others by permission of the instructor.

Lecs, M W F 12:20 or 1:25; lab, M 10:10–11:40, 2:30–4 (two sections), or T 7:30–9 p.m., or T 10:10–11:40, 12:20–1 hour, or 2:30–4 (two sections). Staff.

Statistical methods are developed and used to analyze data arising from a wide variety of applications. Topics include descriptive statistics, point and interval estimation, hypothesis testing, inference for a single population, comparisons among two populations, one- and two-way analysis of variance, comparisons among population means, analysis of categorical data, and correlation and regression analysis. Interactive computing is introduced through MINITAB statistical software. Emphasis is on basic principles and criteria for selection of statistical techniques.

602 Statistical Methods II

Spring. 4 credits. Limited to graduate students; others by permission of instructor. Prerequisite: Statistics 601 or equivalent. Letter grades only.

Lecs, M W F 9:05; lab, M 12:20–2:15 or 2:30–4:25 (two sections), or T 10:10–12:05 or 12:20–2:15.

A continuation of Statistics 601. Emphasis on (1) data analysis and inference for a wide variety of research situations using standard multiple regression techniques and (2) design of experiments. Case studies and hands-on computing using the SAS statistical computing package. Topics include estimating and interpreting sequential and partial coefficients and sums of squares, prediction, residual plotting, model building, estimation of standard errors, principles and practice of randomization, replication and blocking, analysis of sample means from one-way and multilayer classifications, factorial experiments, estimation of contrasts, covariance analysis, comparison of regression lines, model (variable) selection with many predictor variables, spil plot experiments, nested models, and variance components. Selected topics from pairwise comparisons among means, transformations of data, response surface methodology, treatment design, weighted regression, and incomplete block designs, nonlinear model estimation, random effects models, repeated measurements studies, combining experiments, analysis of categorical data, and multivariate analysis.

603 Statistical Methods III

Fall. 3 credits. Prerequisite: Statistics 601 and 602 or permission of instructor. Offered if a sufficient number of students are interested. Offered alternate years; not offered 1987–88.

Principles of scientific experimentation, experiment design, sample surveys and questionnaire design, statistical aspects of survival analysis, life tables, statistical analyses for clinical trials; categorical data analysis, including logistic regression, loglinear models, combining contingency tables, and application to case control studies; multivariate analysis; and space-time clustering.

605 Applied Regression Analysis

Fall, ⅓ of the term. 1 credit. Prerequisite: Statistics 408 and 602.


A continuation of Statistics 602, with emphasis on data analysis using a regression or linear model approach.

606 Sampling Biological Populations

Fall, ⅓ of the term. 1 credit. Prerequisite: Statistics 601 or equivalent. Offered alternate years. Not offered 1987–88.

Standard methods of sample-survey design and estimation are presented, including stratified-random sampling, cluster sampling, double sampling, and variable probability sampling. Special emphasis given to methods of particular utility or specifically designed for biological sampling. Examples are taken from forestry, fisheries, and other biological areas.

607 Nonparametric and Distribution-Free Statistical Methods

Spring, ⅓ of the term. 1 credit. Prerequisite: Statistics 601 or equivalent. S-U grades optional.

Staff.

Nonparametric and distribution-free alternatives to normal-theory testing procedures are presented. Topics include normal-theory tests, location and scale tests for two populations; analyses for completely randomized, randomized blocks, and balanced incomplete block designs; comparisons among several means; correlation and regression, and goodness-of-fit.
639 Epidemiology Seminar (also Nutritional Sciences 639) Fall and spring. 1 credit. Limited to graduate students; others by permission of instructor. S-U grades only. M 12-20. Staff. This course will develop skills in the preparation and interpretation of epidemiological data by discussing current research topics and issues.

[662 Mathematical Ecology (also Biological Sciences 662) Spring. 3 credits. Prerequisites: a year of calculus and a course in probability. Offered alternate years. Not offered 1987–88. Mathematical and statistical analysis of populations and communities with mathematical models. Spatial and temporal pattern analysis, deterministic and stochastic models of population dynamics. Model formulation, parameter estimation, and simulation and analytical techniques.]

699 Special Problems in Statistics and Biometry Fall, spring, or summer. 1 credit or more by arrangement with instructor. Staff.

[701 Advanced Biometry Spring. 3 credits. Prerequisites: Statistics 409 and 602. Limited to graduate students; others by permission of instructor. Offered alternate years. Not offered 1987–88. Bioassay methods, including parametric and nonparametric statistical analyses of quanlified and graded response to controlled levels of single and multifactor stimuli; directional statistics as applied to animal orientation experiments; compartment models and analyses; enzyme kinetics and pharmacokinetic analysis, and bioavailability.]

[713 Experiment Design Fall. 4 credits. Prerequisites: Statistics 410, 416, 417, or 602 or equivalent. Limited to graduate students; others by permission of instructor. Offered alternate years. Not offered 1986–87. Principles and techniques of experimentation, theoretical concepts, extensions and variations of the completely randomized, generalized block, and randomized block and randomized row-by-column experiment designs, repeated measures designs, interval estimation for ranked means, transformations, unequal variances, additivity, residual analyses, sample size, variance component analyses, unequal number analyses, the place of orthogonality, balance and confounding in design, model selection, and advanced statistical methodology.]

[714 Treatment Design and Related Experiment Fall. 4 credits. Prerequisites: Statistics 410, 416, and 417 or 602. Not offered 1987–88. Staff. Treatment design, the selection of treatments for an experiment, is divided into factorial, response surfaces, mixtures, and combinations of these. Single-degree-of-freedom contrast matrices, factorial design theory for prime powers and nonprime powers, confounding, split plot, complex confounded designs, lattice designs derived from pseudofactorial theory, fractional replications, response surface designs, and analyses for mixtures, including diallel crossing designs, are covered. Statistical analyses involving residual analyses of mixed models and sequential tests are included. Emphasis is on concepts and applications rather than mathematical manipulations.]

717 Linear Models Spring. 3 credits. S-U grades only. Prerequisites: Statistics 409 or equivalent, and Statistics 417 and 602. Offered alternate years. Lecs. M W F 12:20; S. R. Searle. Introduction to linear models and estimation procedures for unequal subclass-number data. Topics include cell means models for the one-way classification, both with and without interactions; regression classification and classification of models, introduction to multinominal variables and the distribution of quadratic forms. The general linear model (in matrix and vector form), estimable functions and testable hypotheses. Overparameterized models, restricted models, multivariate factors, covariances, and the distribution of their estimable functions. The general linear model (in matrix and vector form), estimation and interpretation of statistical data by discussing current research topics and issues.

[718 Variance Components Spring. 2 credits. Prerequisite: Statistics 517. S-U grades only. Offered alternate years. Not offered 1987–88. Several methods of estimating variance components are explained and compared: for balanced data (equal subclass numbers), the analysis of variance method; for unbalanced data (unequal subclass numbers), the three Henderson methods and the methods of maximum likelihood, restricted maximum likelihood, and minimum norm unbiasedness. Also included are estimation from mixed models, prediction of random variables, the dispersion-mean model, and computer package output for variance component estimation.]

799 Statistical Consulting Fall or spring. 2 credits. S-U grades only. Limited to graduate students. Lec. W 1:25 plus 1 hour of consulting to be arranged. Staff. Participation in the Biometrics Unit consulting service: faculty-supervised statistical consulting with researchers from other disciplines. Discussion sessions for joint consideration of selected consultations encountered by the service during previous weeks.

890 Research Fall or spring. Credit to be arranged. Limited to candidates for graduate degrees. Prerequisite: permission of the graduate field member concerned. S-U grades only. Research at the M.S. level.

990 Research Fall or spring. Credit to be arranged. Limited to candidates for graduate degrees. Prerequisite: permission of the graduate field member concerned. S-U grades only. Research at the Ph.D. level.

Vegetable Crops


Acquaints students with the vegetable species grown in the Northeast and the pests and disorders encountered in their production, which is very helpful to anyone desiring to garden organically. Subjects covered include vegetable types and kinds, harvest, identification of economically destructive weeds, diseases and insects of vegetables, identification of vegetable and weed seeds, nutrient deficiencies, and vegetable judging.

210 Vegetable Types and Identification Fall. 2 credits. T 10:10–12:05 or 2–4: L. D. Topoleski.

211 Commercial Vegetable Crops Fall. 4 credits. Prerequisites: Vegetable Crops 103 and Agronomy 265. Field trip fee of no more than $20 may be charged. Lecs. M W F 11:15; lab, W 2–4:25; 1.5 field trip and 3 field trips (Sept.), W 11:15–6. L. A. Ellerbrock.

Intended for those interested in the commercial vegetable industry from the viewpoint of production, processing, marketing and service industries. Topics included are techniques, problems, and trends in the culture, harvesting, and storage of the major vegetable crops, including potatoes and dry beans.

319 Fundamentals of Postharvest Physiology, Handling, and Storage of Horticultural Crops (also Agricultural Engineering 319 and Pomology 319) Fall. 3 credits. Prerequisite: A course in floriculture, pomology, or vegetable crops or permission of instructor. Lecs. M W F 9:05; lab, F 1:25–3:55. F. W. Liu, J. R. Hicks, J. A. Bartsch.

The physiology—transpiration, respiration, ethylene synthesis and action, maturation, ripening, and senescence—of fruits, vegetables, flowers, and ornamental crops is studied. Environmental factors influencing the physiological process, thus affecting the quality and marketability of the products, are considered. The principles and methods of harvesting, cleaning, grading, packing, precoring, waxing, sanitization, and transport of the products are studied. Storage methods, including common storage, refrigerated storage, controlled-atmosphere storage, and hypobaric storage, are discussed.


Studies of maturity indices, preharvest treatments and harvesting, handling, storage, and transportation requirements and practices of important vegetable crops.


A study of physical and physiological changes of horticultural crops and how quality is modified during marketing. Emphasis will be placed on how the following regulations and market practices influence ultimate quality: marketing orders, marketing chain, market requirements, quarantine and pest eradication procedures, and the Perishable Agricultural Commodities Act.

401 Vegetable Crop Physiology Fall. 5 credits. Prerequisites: Vegetable Crops 211 and Biological Sciences 242 or equivalent. Lecs. M W F 10–10:25; lab, M 9:05–9:30; disc, R or F 1:25, or 3:30. J. C. Wien, P. L. Minotti.

Subjects include mineral nutrition as influenced by fertilization programs and crop sequence, nutrient interactions and induced deficiencies, growth and development, flowering, fruit setting, growth correlation, senescence, sex expression, photoperiodism, vernalization, and environmental factors affecting growth.

413 Kinds and Varieties of Vegetables Fall. 4 credits. Prerequisite: Vegetable Crops 211 or permission of instructor. Offered alternate years. Not offered 1987–88. Lab, W F 2–4:25. Staff.

Designed to help students achieve proficiency in the evaluation of vegetable varieties and the identification of their origins, characteristics, adaptation, and usage. An important part of the course is the study of crops in the field. The vegetable seed industry is also examined.

421 Plant-Plant Interactions Spring. 3 credits. Each disc limited to 6 students. Prerequisite: any crop production course or permission of instructor. Not offered 1987–88. Lecs. M W 6; disc, R or F 1, 2, or 3. P. L. Minotti.

The manner in which plants interfere with other plants is examined with primary emphasis on crop situations.
rather than natural plant communities. Competitive and chemical interactions are considered between weeds and crops, crops and associate crops, and also between individuals in monoculture.]

499 Undergraduate Research Fall or spring. 1 or more credits, by arrangement. Written permission from staff member directing the work must be obtained before course enrollment. Hours to be arranged. Staff. Special problems may be elected in any line of vegetable work.

601 Seminar Fall or spring. 1 credit. Limited to graduate students. Required of graduate students majoring or minoring in vegetable crops. S-U grades only. R 4-30. Staff.

[612 Advanced Postharvest Physiology of Horticultural Crops] Spring. 3 credits. Prerequisite: Vegetable Crops/Agricultural Engineering/Pomology 319. Offered alternate years. Not offered 1986–87. Lecs. TR 10:10. Disc to be arranged. P. M. Ludford. Physiological and biochemical aspects of growth and maturation, ripening, and senescence of harvested horticultural plant parts. Topics include morphology and compositional changes in ripening and during storage life, some physiological disorders, aspects of hormone action and interactions, and a consideration of control.]

620 Teaching Experience Fall or spring. 1 or more credits by arrangement with instructor. Hours to be arranged. Staff. Participation in the teaching program of the department.


801 Master's Thesis Research Fall or spring. Credit to be arranged. S-U grades only. Hours to be arranged. Staff.

901 Doctoral Thesis Research Fall or spring. Credit to be arranged. S-U grades only. Hours to be arranged. Staff.

Related Course in Another Department

Special Topics in Plant Science Extension (Plant Breeding 629)

Faculty Roster

Abawi, George S., Ph.D., Cornell U. Prof., Plant Pathology (Geneva)
Acree, Terry E., Ph.D., Cornell U. Prof., Food Science and Technology (Geneva)
Adleman, Marvin I., M.A.A., Harvard U., Prof., Floriculture and Ornamental Horticulture
Agnew, Arthur M., Ph.D., North Carolina State U. Asst. Prof., Entomology (Geneva)
Aist, James R., Ph.D., U. of Wisconsin. Prof., Plant Pathology
Albright, Louis D., Ph.D., Cornell U. Prof., Agricultural Engineering
Alconero, R. Ph.D., U. of Wisconsin. Assoc. Prof., Horticulture and Ornamental Horticulture (Geneva)
Aldwinek, Herbert S., Ph.D., U. of London (England). Prof., Plant Pathology (Geneva)
Alexander, Martin, Ph.D., U. of Wisconsin. Liberty Hyde Baker Professor of Soil Science. Agronomy
Allee, David J., Ph.D., Cornell U. Prof., Agricultural Economics
Andersen, Robert L., Ph.D., U. of Minnesota. Prof., Agricultural Economics
Anderson, Bruce L., Ph.D., U. of California at Berkeley. Assoc. Prof., Agricultural Economics
Anderson, Ronald E., Ph.D., U. of Wisconsin. Assoc. Prof., Plant Breeding and Biometry
Annesley, Daniel J. Ph.D., Cornell U. Assoc. Prof., Agricultural Engineering
Appar, Barbara J., Ph.D., Cornell U. Asst. Prof., Animal Science
Apgin, Richard D., Ph.D., Cornell U. Prof., Agricultural Economics
Ames, Phil A., Ph.D., U. of Wisconsin. Assoc. Prof., Plant Physiology
Austic, Richard E., Ph.D., U. of California at Davis. Assoc. Prof., Poultry and Avian Sciences
Awa, Njoku E., Ph.D., Cornell U. Assoc. Prof., Communication
Baer, Richard A., Ph.D., Harvard U. Prof., Natural Resources
Bail, Joe P., Ph.D., Michigan State U. Prof., Education
Baker, Robert C., Ph.D., Purdue U. Prof., Poultry and Avian Sciences
Bander, David K., M.P.S., Cornell U. Food Science
Barbano, David M., Ph.D., Cornell U. Assoc. Prof., Food Science
Barker, Randolph, Ph.D., Iowa State U. Prof., Agricultural Economics
Barth, James A., Ph.D., Purdue U. Assoc. Prof., Agricultural Engineering
Batt, Carl A., Ph.D., Rutgers U. Asst. Prof., Food Science
Bauman, Dale E., Ph.D., U. of Illinois. Prof., Animal Science
Bechinski, Edward J., Ph.D., Iowa State U. Asst. Prof., Agricultural Engineering
Becker, Robert F., M.S., U. of New Hampshire. Assoc. Prof., Horticultural Sciences (Geneva)
Beier, Steven V., Ph.D., U. of California at Davis. Assoc. Prof., Plant Pathology
Beiermann, Donald H., Ph.D., U. of Wisconsin. Prof., Agricultural Economics
Bell, Alan W., Ph.D., U. of Glasgow (Scotland). Asst. Prof., Animal Science
Bellinder, Robin R., Ph.D., Virginia Polytechnic Inst. and State U. Asst. Prof., Vegetable Crops
Bergstrom, Gary C., Ph.D., U. of Kentucky Asst. Prof., Plant Pathology
Berkeley, Arthur L., Ph.D., Michigan State U. Prof., Education
Bills, Nelson L., Ph.D., Washington State U. Assoc. Prof., Agricultural Economics
Blake, Robert W., Ph.D., North Carolina State U. Assoc. Prof., Animal Science
Blandford, David, Ph.D., Manchester U. Assoc. Prof., Agricultural Economics
Blampied, George D., Ph.D., Michigan State U. Prof., Pomology
Bloom, Stephen E., Ph.D., Penn State U. Prof., Poultry and Avian Sciences
Bover, Richard D., Ph.D., U. of Minnesota. Prof., Agricultural Economics
Boulind, David R., Ph.D., Iowa State U. Prof., Agronomy
Bourque, John B., Ph.D., Oregon State U. Prof., Food Science and Technology (Geneva)
Bourne, Malcolm C., Ph.D., U. of California at Davis. Prof., Food Science and Technology (Geneva)
Boyd, Ron Dean, Ph.D., U. of Nebraska. Assoc. Prof., Animal Science
Brady, John W., Jr., Ph.D., SUNY at Stonybrook. Asst. Prof., Food Science
Brake, John R., Ph.D., North Carolina State U. W I. Myers Professor of Agricultural Finance, Agricultural Economics
Broadway, Roxanne M., Ph.D., U. of California at Davis. Asst. Prof., Entomology (Geneva)
Broaddus, George J., Ph.D., Cornell U. Assoc. Prof., Cooperative Extension
Brodie, Bill B., Ph.D., North Carolina State U. Prof., Plant Pathology (Geneva)
Brown, Susan K., Ph.D., U. of California at Davis. Asst. Prof., Plant Pathology (Geneva)
Brown, William L., Jr., Ph.D., Harvard U. Prof., Entomology
Bruce, Robert L., Ph.D., Cornell U. Prof., Education
Brumsted, Harlan B., Ph.D., Cornell U. Assoc. Prof., Natural Resources
Bryant, Ray B., Ph.D., Purdue U. Asst. Prof., Agronomy
Burgian, Joseph B., LL.B., Cornell U. Prof., Agricultural Economics
Burt, Thomas J., Ph.D., U. of California at Berkeley. Assoc. Prof., Plant Pathology (Geneva)
Butler, Waplin R., Ph.D., Purdue U. Assoc. Prof., Animal Science
Buttel, Frederick H., Ph.D., U. of Wisconsin. Prof., Rural Sociology
Call, David L., Ph.D., Cornell U. Prof., Agricultural Economics
Campbell, Joseph K., M.S., Cornell U. Prof., Agricultural Engineering
Carse, Lee F., Ph.D., Purdue U. Asst. Prof., Plant Breeding and Biometry
Casler, George L., Ph.D., Purdue U. Prof., Agricultural Economics
Chapman, Lewis D., Ph.D., U. of California at Berkeley. Prof., Agricultural Economics
Chase, Larry E., Ph.D., Penn State U. Assoc. Prof., Animal Science
Coffman, William R., Ph.D., Cornell U. Prof., Plant Breeding and Biometry
Colle, Royal D., Ph.D., Cornell U. Prof., Communication
Combs, Gerald F., Ph.D., Cornell U. Assoc. Prof., Poultry and Avian Sciences
Compton, James L., Ph.D., U. of Michigan. Assoc. Prof., Education
Conrey, James R., Ph.D., Cornell U. Asst. Prof., Education
Conneman, George J., Ph.D., Penn State U. Prof., Agricultural Economics
Conrad, Jon M., Ph.D., U. of Wisconsin. Assoc. Prof., Agricultural Economics
Cooke, J. Robert, Ph.D., North Carolina State U. Prof., Agricultural Engineering
Coward, E. Walter, Ph.D., Iowa State U. Prof., Rural Sociology
Cow, William J., Ph.D., Oregon State U. Asst. Prof., Agronomy
Creasy, Leroy L., Ph.D., U. of California at Davis. Prof., Pomology
Cummins, James N., Ph.D., Southern Illinois U. Prof., Horticultural Sciences (Geneva)
Cunningham, Danis L., Ph.D., Virginia Polytechnic Inst. Assoc. Prof., Poultry and Avian Sciences
Cupp, Edith W., Ph.D., U. of Illinois. Assoc. Prof., Entomology
Currie, W. Bruce, Ph.D., Macquarie U. Assoc. Prof., Animal Science
Cushman, Harold R., Ph.D., Cornell U. Prof., Education
Datta, Ashim K., Ph.D., U. of Florida. Asst. Prof., Agricultural Economics
DeGloria, Stephen D., Ph.D., U. of California at Berkeley. Asst. Prof., Agronomy
Dennis, Timothy J., Ph.D., U. of California at Davis. Assoc. Prof., Entomology (Geneva)
Deshler, J. David, Ed.D., U. of California at Los Angeles. Assoc. Prof., Education
Dethier, Bernard E., Ph.D., Johns Hopkins U. Prof., Agronomy
Dickson, Michael H., Ph.D., Michigan State U. Prof., Agricultural Economics
Dietert, Rodney R., Ph.D., U. of Texas at Austin. Assoc. Prof., Poultry and Avian Sciences
Dillard, Helene R., Ph.D., U. of California at Berkeley. Asst. Prof., Plant Pathology (Geneva)
Dockerty, Terence R., Ph.D., Ohio State U. Asst. Prof., Animal Science
Dolan, Desmond D., Ph.D., Cornell U. Assoc. Prof., Horticultural Sciences (Geneva)
Downing, Donald L., Ph.D., U. of Georgia. Prof., Food Science and Technology (Geneva)
VanWambeke, Armand R., Ph.D., U. of Ghent (Belgium). Prof., Agronomy
Via, Sara, Ph.D., Duke U. Asst. Prof., Entomology
Vliands, Donald R., Ph.D., U. of Minnesota. Assoc. Prof., Plant Breeding and Biometry
Villani, Michael G., Ph.D., North Carolina State U. Asst. Prof., Entomology (Geneva)
Wagenet, Robert J., Ph.D., U. of California at Davis. Prof., Agronomy
Walker, Larry P., Ph.D., Michigan State U. Assoc. Prof., Agricultural Engineering
Wallace, Donald H., Ph.D., Cornell U. Prof., Vegetable Crops
Walter, Michael F., Ph.D., U. of Wisconsin. Assoc. Prof., Agricultural Engineering
Walter, Reginald H., Ph.D., U. of Massachusetts. Assoc. Prof., Food Science and Technology (Geneva)
Ward, William B., M.S., U. of Wisconsin. Prof., Communication
Wardeberg, Helen L., Ph.D., U. of Minnesota. Prof., Education
Warner, Richard G., Ph.D., Cornell U. Prof., Animal Science
Weeden, Norman E., Ph.D., U. of California at Davis. Asst. Prof., Horticultural Sciences (Geneva)
Weiler, Thomas C., Ph.D., Cornell. Assoc. Prof., Floriculture and Ornamental Horticulture
Weires, Richard W., Ph.D., U. of Minnesota. Assoc. Prof., Entomology (Geneva)
Welch, Ross M., Ph.D., U. of California at Davis. Asst. Prof., Agronomy
Wheeler, Quentin D., Ph.D., Ohio State U. Assoc. Prof., Entomology
White, Gerald B., Ph.D., Penn State U. Assoc. Prof., Agricultural Economics
White, Shirley A., Ph.D., Michigan State U. Prof., Communication
Wien, Hans C., Ph.D., Cornell U. Assoc. Prof., Vegetable Crops
Wilcox-Lee, Darlene, Ph.D., U. of Florida. Asst. Prof., Vegetable Crops
Wilcox, Wayne F., Ph.D., U. of California at Davis. Asst. Prof., Plant Pathology (Geneva)
Wilkins, Bruce T., Ph.D., Cornell U. Prof., Natural Resources
Wilkinson, Christopher F., Ph.D., U. of California at Riverside. Prof., Entomology
Wilks, Daniel S., Ph.D., Oregon State U. Asst. Prof., Agronomy
Wing, Kenneth E., Ph.D., Cornell U. Prof., Agriculture
Wolfe, David W., Ph.D., U. of California at Davis. Asst. Prof., Vegetable Crops
Wright, Madison J., Ph.D., U. of Wisconsin. Prof., Agronomy
Yarbrough, J. Paul, Ph.D., Iowa State U. Prof., Communication
Yoder, Olen C., Ph.D., Michigan State U. Prof., Plant Pathology
Young, Frank W., Ph.D., Cornell U. Prof., Rural Sociology
Youngs, William D., Ph.D., Cornell U. Prof., Natural Resources
Zaitlin, Milton, Ph.D., U. of California at Los Angeles. Prof., Plant Pathology
Zall, Robert R., Ph.D., Cornell U. Prof., Food Science
Zinder, Stephen H., Ph.D., U. of Wisconsin. Assoc. Prof., Microbiology
Zitter, Thomas A., Ph.D., Michigan State U. Assoc. Prof., Plant Pathology
Zobel, Richard W., Ph.D., U. of California at Davis. Assoc. Prof., Plant Breeding and Biometry/ Agronomy
College of Architecture, Art, and Planning

Administration
William G. McMinn, dean
Stuart W. Stein, associate dean for external affairs
John P. Shaw, associate dean for internal affairs
Ellen McCollister, director of external affairs
Cynthia K. Nordby, director of external operations
Thomas Fowler, director of minority educational affairs
Donna L. Kuchar, registrar
Elizabeth A. Cutter, admissions coordinator
Betty Gangle, accountant
Margaret Webster, slide curator
Kim Alexander, career office coordinator

Faculty Advisers
Freshmen are assigned faculty advisers for their first year and are also invited to share their concerns and seek advice from the volunteer student advisers at any time.
Upperclass students have no regular assigned advisers and are free to seek assistance and advice from the most appropriate faculty member or college officer.
Specific inquiries regarding rules, procedures, or deadlines should be addressed to:
Thomas Fowler, director of minority educational affairs
Jerry A. Wells, chairman, Department of Architecture
William Goldsmith, chairman, Department of City and Regional Planning

Degree Programs

<table>
<thead>
<tr>
<th>Degree Programs</th>
<th>Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Architecture</td>
<td>B.Arch.</td>
</tr>
<tr>
<td>Fine Arts</td>
<td>B.F.A.</td>
</tr>
<tr>
<td>History of Architecture and Urban Development</td>
<td>B.S.</td>
</tr>
<tr>
<td>Urban and Regional Studies</td>
<td>B.S.</td>
</tr>
</tbody>
</table>

The college offers programs leading to the bachelor's degree—the five-year program in architecture leads to the Bachelor of Architecture, four-year programs in art and architecture lead to the Bachelor of Fine Arts. In addition, four-year programs with a concentration in either urban and regional studies or history of architecture lead to the Bachelor of Science.

Graduate-level programs are offered in art, architectural design and urban and regional design, architectural sciences, history of architecture and urban development, preservation planning, city and regional planning, regional science, and landscape architecture.

Students in each of these programs work in physical proximity to one another and thus gain a broader understanding of their own special area of interest through contact with the students and faculty in other disciplines.

Early in its development the college set a limit on the number of students it would enroll and devised a selective method of admission. There are now more than 650 students and a full-time teaching staff of over fifty-five, supplemented by visiting professors and critics, part-time lecturers, and assistants. Teachers and students mix freely, and much instruction and criticism is on an individual basis.

The college's courses are integral parts of the professional curricula. Fundamental subjects are taught by faculty members whose experience provides them with professional points of view. The concentration of professional courses within the college is balanced by the breadth of view gained from courses and informal learning in the rest of the university. The college believes that this breadth is an essential element of professional education. This conviction is evident in the form of the curriculum, the methods of teaching, and the extracurricular life of teachers and students.

Facilities
The college occupies Sibley Dome, Olive Tjaden Hall, Rand Hall, and the Foundry. In Sibley are the facilities for architecture, art, and city and regional planning, as well as certain administrative offices and the Fine Arts Library. The Department of Art is housed in Olive Tjaden Hall. Sculpture and shop facilities are in the Foundry. The Green Dragon, a student lounge, is located in the basement of Sibley Dome. The college has three darkrooms that are available for general use and serve as laboratories for the photography courses. A darkroom fee must be paid by each user. Information about darkroom rules and regulations, hours, and equipment is available in the slide library.

Through the generosity of the late Lillian P. Heller, the college owns the home of William H. Miller, the first student to enroll for the study of architecture at Cornell and later a practicing architect in Ithaca. This building is used to house visiting teachers and guests of the college and for occasional receptions and social events.

Libraries
The Fine Arts Library in Sibley Dome, serves the College of Architecture, Art, and Planning through its collections on architecture, fine arts, and city and regional planning. The library, with more than 123,000 books, is capable of supporting undergraduate, graduate, and research programs. Some 1,900 serials are currently received and maintained.

A slide library in Sibley Dome contains the F. M. Wells Memorial Slide Collection, which consists of a large and growing collection of slides of architecture, architectural history, and art. The library now includes approximately 300,000 slides.

The facilities of the libraries of other schools and departments on campus and the John M. Olin Library, designed primarily as a research library for graduate students, are also available.

Museums and Galleries
The Herbert F. Johnson Museum of Art was formally opened in May 1973. Although many of its exhibitions and activities relate directly to academic programs of the university, the museum has no administrative affiliation with any department. In this way, its programs freely cross academic boundaries, stimulating interchange among disciplines. With a strong and varied collection and a continuous series of high-quality exhibitions, it fulfills its mission as a center for the visual arts at Cornell. Art galleries are also maintained in Willard Straight Hall, where loan exhibitions of paintings and graphic work by contemporary artists are held. Current work of students in the College of Architecture, Art, and Planning is shown in the exhibition areas in Sibley Dome and the gallery in Olive Tjaden Hall.

Exhibitions of Student Work
Exhibitions of student work will be held each semester as part of the yearly schedule of the Olive Tjaden Hall gallery and the John Hartell Gallery. These may display the work of a specific course or exhibit examples of the best recent work done.

Scholastic Standards
Term by term, a candidate for an undergraduate degree in this college is required to pass all courses in which the student is registered and have a weighted average for the term of not less than C (2.0). The record of each student who falls below the standard will be reviewed by the Student Records Committee for appropriate action. As described below:

1) Warning means that the student's performance is not up to expectations. Unless improvement is shown in the subsequent term, the student may be placed on final warning or may be suspended.

2) Final Warning indicates that the student's record is unsatisfactory. Unless considerable improvement is shown in the subsequent term, the student is subject to dismissal from the college.

3) Suspended: Academic Deficiency. The student is dismissed from the college and may not continue studies in the college. A student who has been suspended may apply for readmission after an absence of at least two semesters. Application for readmission is made by letter, addressed to the department chairperson. The student must submit evidence that his or her time has been well spent since suspension, and, if employed, must submit a letter from an immediate superior. Readmission to the college after suspension is at the discretion of the Admissions Committee. Application for spring-term readmission must be made by November 15, and application for fall-term readmission must be made by April 15.

4) Dismissed: May Not Reregister, College of Architecture, Art, and Planning. The student is dismissed from the college and is permanently prohibited from continuing studies in it. This dismissal does not preclude the possibility of applying for admission to another division of the university.

The above actions are not necessarily sequential. A student who has received a warning may be suspended for academic deficiency at the end of the next term if performance during that time is deemed to be grossly deficient.

It is necessary to have a cumulative average of at least C (1.7) for graduation.

Architecture

Professional Degree Program
The first professional degree in architecture is the Bachelor of Architecture. This degree counts toward the professional registration requirements established by the various states and the National Council of Architectural Registration Boards. The professional program is normally five years in length and is designed particularly for people who, before they apply, have established their interest and motivation to enter the field. It therefore incorporates both a general and professional educational base.
The program is oriented toward developing the student’s ability to deal creatively with architectural problems on analytical, conceptual, and developmental levels. The sequence courses in design, consisting of studio work augmented by lectures and seminars dealing with theory and method, are the core of the program. Sequences of studies in human behavior, environmental science, structures, and building technology provide a base for the work in design.

In the first three years the student has the opportunity to establish a foundation in the humanities and sciences through electives. During the fourth and fifth years this base may expand and be applied by further study in these areas. Within the professional program a basis for understanding architecture in its contemporary and historical cultural context is established.

The structure of the program incorporates considerable flexibility for the individual student to pursue his or her particular interest in the fourth and fifth years. By carefully planning options and electives in the fifth year, it is possible for a qualified student to apply the last year’s work to the Bachelor of Architecture degree and to one of the graduate programs offered in the department. Some students are then able to complete the requirements for the master’s degree in one additional year.

**Washington Program**

Fourth- and fifth-year students in good standing who have completed the requirements of the first three years of the curriculum are eligible for a term of study in Washington, D.C. Outstanding third-year students are admitted to the Washington program only by petition and a review of their design record. Courses offered by the department include design, thesis, history, special problems in architectural design, a professional seminar, and professional studies. Additional courses are offered by other departments participating in the program. The program provides a period of intensive exposure to the characteristics of urban development within the framework of a design studio. Content concentrates on urban design issues, constraints relative to financing, zoning, development criteria, adaptive reuse, and multiuse developments.

**Overlap Program**

For qualified students the department offers an option that combines the fifth year of the undergraduate program with the first year of the Master of Architecture program. In the fall of the fourth undergraduate year interested students petition the department to substitute Arch 601–602 for Arch 501–502. At the same time, they complete graduate school applications and submit them with fee and portfolio to the graduate field secretary for architecture. Students accepted into the program may not normally begin until the fall of their fifth year and, once enrolled, may not transfer back into the 501–502 sequence.

Following admission into the Overlap Program, students may petition to apply toward the requirements of the master’s degree a maximum of 30 credits, including Arch 601–602 and other advanced courses taken in excess of distribution requirements for the Bachelor of Architecture degree.

**Curriculum**

**First Year**

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td>101 Design I</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>181 History I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>151 Drawing I</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Math III Calculus</td>
<td>4</td>
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<tr>
<td></td>
<td>Out-of-college elective</td>
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<tr>
<td></td>
<td>Freshman Seminar</td>
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</tr>
<tr>
<td></td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Spring</td>
<td>102 Design II</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>182 History of Architecture</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>152 Drawing II</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>122 Structural Concepts</td>
<td>4</td>
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<td></td>
<td>Out-of-college elective</td>
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<tr>
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**Second Year**

<table>
<thead>
<tr>
<th>Semester</th>
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<tr>
<td>Fall</td>
<td>201 Design III</td>
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<tr>
<td></td>
<td>221 Structural Systems I</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>231 Architectural Elements and Principles</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>261 Site Planning</td>
<td>3</td>
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<td>Out-of-college elective</td>
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<td></td>
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<td>Spring</td>
<td>202 Design IV</td>
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<td></td>
<td>222 Structural Systems II</td>
<td>3</td>
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<td></td>
<td>232 Design Methods and Programming</td>
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<td>262 Building Technology, Materials, and Methods</td>
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**Third Year**

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<thead>
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<tbody>
<tr>
<td>Fall</td>
<td>301 Design V</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>361 Environmental Controls I—Lighting and Acoustics</td>
<td>3</td>
</tr>
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<td></td>
<td>Departmental elective</td>
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<td>Out-of-college elective</td>
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<td></td>
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<tr>
<td>Spring</td>
<td>302 Design VI</td>
<td>6</td>
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<td>362 Environmental Controls II—Mechanical and Passive Solar Systems</td>
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<td>College or out-of-college elective</td>
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**Fourth Year**

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<td></td>
<td>461 Professional Practice</td>
<td>3</td>
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<td></td>
<td>Departmental elective</td>
<td>3</td>
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<td></td>
<td>18</td>
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<td>Spring</td>
<td>402 Design VIII</td>
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**Fifth Year**

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<tbody>
<tr>
<td>Fall</td>
<td>501 Design IX</td>
<td>6</td>
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<tr>
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<td>College or out-of-college elective</td>
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<tr>
<td></td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Spring</td>
<td>502 Design X or</td>
<td>6</td>
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<tr>
<td></td>
<td>504 Design X Thesis or</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>602 or 604 Special Program</td>
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**Required Departmental Courses**

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<tr>
<th>Term Subject</th>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>10 design</td>
<td>101-504</td>
<td>Math III or approved elective</td>
<td>62</td>
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<tr>
<td>3 structures</td>
<td>212, 221, 222</td>
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<tr>
<td>4 technology</td>
<td>261, 262, 361, 362</td>
<td>12</td>
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<tr>
<td>2 architectural principles theories, and methods</td>
<td>231, 232</td>
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<tr>
<td>2 history of architecture</td>
<td>181, 182</td>
<td>6</td>
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</tr>
<tr>
<td>1 professional practice</td>
<td>461</td>
<td>3</td>
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<tr>
<td>2 drawing</td>
<td>151, 152</td>
<td>4</td>
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**Electives**

<table>
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**College**

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**Free**

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</table>

**Total credits**

177

**Transfer Students**

Although the program leading to the Bachelor of Architecture is specifically directed to those who are strongly motivated to begin professional study when entering college, it is sufficiently flexible to allow transfers for students who have not made this decision until after they have been in another program for one or two years. Individuals who have already completed an undergraduate degree must also apply to transfer to the Bachelor of Architecture degree program, since the graduate program in architecture requires the Bachelor of Architecture degree or its equivalent for entrance.

Transfer students are responsible for completing that portion of the curriculum that has not been covered by equivalent work. Applicants who have had no previous work in architectural design must complete the ten-term design sequence. Since this sequence may be accelerated by attending summer terms, seven or eight regular terms and two or three summer terms are typically required.

For those who would benefit from an opportunity to explore the field of architecture before deciding on a commitment to professional education, the department offers an introductory summer program that includes an introductory studio in architectural design, lectures, and other experiences designed to acquaint the participants with opportunities, issues, and methods in the field of architecture.

Admission is offered to a limited number of transfer applicants who have completed a portion of their architecture studies in other schools. Each applicant’s case is considered individually.
complete a minimum of 70 credits and four terms in residence, taking 35 of the 70 credits (including four terms of design) in the Department of Architecture. Placement in the design sequence is based on a review of a representative portfolio of previous work.

Alternative Programs

Bachelor of Fine Arts

After completing the first four years of requirements, the student may choose to receive the degree of Bachelor of Fine Arts (B.F.A.) in architecture. It is not a professional degree.

Bachelor of Science in History of Architecture

The history of architecture major leads to a Bachelor of Science degree, conferred by the College of Architecture, Art, and Planning. The major is intended for transfer students from other programs at Cornell and from colleges and universities outside Cornell. Students in the College of Arts and Sciences may take the major as part of a dual-degree program. The course of study in this major, available to students from a variety of academic backgrounds, offers the opportunity for a vigorous exploration of architecture and its history.

Admission requirements. Two years of undergraduate study; Arch 181 and 182, or the equivalent; and one 6-credit studio in architecture (or Arch 103, which is available during the fall semester for students with no previous studio work) are required.

Procedure. Students from Cornell who want to transfer to the program may do so at the beginning of the fall term of their third or fourth year of study. They submit a short application as prospective internal transfer students. It is crucial that, before applying, all prospective internal transfer students meet with a history of architecture faculty member to discuss procedural matters and program content.

Students who want to transfer to the program from outside Cornell must apply to the Department of Architecture, Art, and Planning, Cornell University, 135 East Sibley Hall, Ithaca, New York 14853-6701.

Curriculum. A student entering the program selects an adviser from the history of architecture faculty in the Department of Architecture. Adviser and student together prepare an appropriate two-year course of study according to the following guidelines:

1) 29 credits of 300-level courses in architectural history: Arch 381, 382, 384, 385, 387, 388, 390, 391, and 393
2) 12 credits in 600-level architectural history seminars: Arch 681 through Arch 690, or 6 credits in a 600-level seminar plus Arch 499, offered for honors candidates only
3) 24 credits in electives selected in consultation with the student's adviser
4) Language requirement, to be met in the manner specified for students enrolled in the College of Arts and Sciences

Honors program. Students will graduate with honors if, during their two years of study in the program, they have a cumulative average of B or better in all courses, have no grade lower than A in all history of architecture courses taken at the 300 level, and have completed an honors thesis (Arch 499) deemed to be of distinguished quality by the history of architecture faculty

Dual Degree Options

Students can earn both the B.S. and B.Arch. degrees either simultaneously or sequentially. Students who have transferred into the B.Arch. program at Cornell may find this to be a special opportunity for an enlarged and enriched program of study. Ordinarily this option requires five years of study and assumes the satisfactory fulfillment of requirements in both the B.S. and B.Arch. programs.

Students currently enrolled in the College of Arts and Sciences at Cornell can earn a B.A. in an arts college major and a B.S. in the history of architecture in five years. In this option, students complete a minimum of 150 credits, which includes the B.S. prerequisites and curriculum requirements and 100 credits of the usual distribution and major requirements in the College of Arts and Sciences. Further information about this option is available at the Admissions Office, 135 East Sibley Hall, and at the Academic Advising Center of the College of Arts and Sciences, 55 Goldwin Smith Hall.

Students may also elect to continue toward a Master of Arts degree in the history of architecture. The M.A. ordinarily requires a minimum of two years of graduate work beyond the bachelor's degree: with this special sequential degree arrangement that time is shortened by approximately one year.

Summer Term in Architecture

The summer term offers students the opportunity of a concentrated period of design work. Design is offered at both undergraduate and graduate levels: the term is six to eight weeks in duration.

Undergraduate design sequence courses, including thesis, are offered at first- through fifth-year levels in Ithaca. Normally there is also a design program abroad for third-, fourth-, and fifth-year students.

Students from schools of architecture other than Cornell are welcome to apply to the college for admission to any summer programs.

At the graduate level the summer term is devoted to problems forming part of the student's program of work. The term may carry residence credit equal to that of a normal academic term. Participation in the program cannot be undertaken without the consent of the student's Special Committee.

Architectural Design

Numbers in parenthesis are old course numbers. Courses in brackets are not offered this year.

A studio fee of $25 is charged each semester for every design course (these fees are subject to change).

Elective Design Courses

103–104 (111–112) Elective Design Studio 103, fall; 104, spring. 6 credits each term. Limited to students from outside the department. Prerequisite: permission of instructor. M.W.F 2–6. Staff

303 (310) Special Problems in Architectural Design Fall or spring. Variable credit (maximum, 3). Prerequisite: permission of instructor. Hours to be arranged. Staff. Independent study.

200, 300, 400, 500 Elective Design Fall or spring. 6 credits each term. Open by permission to transfer students who have not been assigned to a sequence course. Prerequisite: permission of department. Each student is assigned to a class of appropriate level. M.W.F 2–6. Staff.

Sequence Courses

101 Design I Fall. 6 credits. Limited to department students. Studios and lecs. M.W.F 2–6. Staff. An introduction to design as a conceptual discipline directed at the analysis, interpretation, synthesis, and transformation of the physical environment. Exercises are aimed at developing an understanding of the issues, elements, and processes of environmental design.

102 Design II Spring. 6 credits. Limited to department students. A continuation of Architecture 101. Studios and lecs. M.W.F 2–6. Staff. Human, social, technical, and aesthetic factors related to spatial form. Design problems range from those of the immediate environment of the individual to that of small social groups.


301–302 Design V and VI Fall and spring. 6 credits each term. Limited to department students. Studios and seminars. M.W.F 2–6. Staff.

401–402 Design VII and VIII Fall and spring. 6 credits each term. Limited to department students. Studios and seminars. M.W.F 2–6. Staff. Programs in architectural design, urban design, architectural technology and environmental science, etc.

501 Design IX Fall or spring. 8 credits. Limited to department students. Studios and seminars. M.W.F 2–6. Staff.

502 Design X—Thesis Fall or spring. 8 credits. Prerequisite: Architecture 501. Required of B.Arch. candidates who must satisfactorily complete a thesis. Students accepted for admission to the Overlap Program are exempt from the thesis requirement. Studios, M.W.F 2–6. Staff.

503–504 Design IX—Thesis I, and Design X—Thesis II Fall or spring. 8 credits each term. Prerequisite: permission of department. Studios, hours to be arranged. Staff. Students who have obtained approval may elect to spend two terms working on the thesis.

510 Thesis Introduction Foreign summer programs and Washington program only. 3 credits. Must be taken in conjunction with Architecture 500. Architecture 500 will be considered equivalent to Architecture 501 when taken concurrently with Architecture 510 during a foreign summer program or in Washington. Lects and seminars. Staff. Lectures, seminars, and independent research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis is followed by tutorial work with the student's advisory committee.

510 Thesis Introduction Foreign summer programs and Washington program only. 3 credits. Must be taken in conjunction with Architecture 500. Architecture 500 will be considered equivalent to Architecture 501 when taken concurrently with Architecture 510 during a foreign summer program or in Washington. Lects and seminars. Staff. Lectures, seminars, and independent research leading to complete development of the student's thesis program. General instruction in the definition, programming, and development of a thesis is followed by tutorial work with the student's advisory committee.

601–602 Special Program in Architectural Design Fall and spring. 9 credits each term. Limited to students who have been accepted into the Overlap Program. Registration by petition only.

603–604 Special Program in Urban Design Fall and spring. 9 credits each term. Limited to students who have been accepted into the Overlap Program. Registration by petition only.

Departmental Electives

342 (162) Introduction to Social Sciences in Design Spring. 3 credits. Not offered every year. Lects. M.W.F 9:05. B. MacDougall. An introduction to concepts and methods in the social sciences for architects; how approaches from anthropology, environmental psychology, and sociology can be used in the study and design of the built environment.

Architecture 81
Structural design concepts and procedures for steel

222 (322) Structural Systems II  Spring. 3 credits.
Prerequisite: Architecture 122
T R 11:15–1:10. Staff.
Structural design concepts and procedures for reinforced concrete building construction.

326 Building Substructure  Spring. 3 credits.
Prerequisites: Architecture 222 or concurrent registration and permission of instructor. Not offered every year.
Sem. hours to be arranged. Staff.
The principles of soil mechanics and subsurface exploration. Design of building foundations—footings, piles, and subgrade walls.

Architectural Principles, Theories, and Methods

131 An Introduction to Architecture  Fall or spring. 3 credits. Open to out-of-department students only.
Hours to be announced. Staff. guest lecturers.
Theory of non-architecture students with the profession of architecture through lectures, readings, and films. Examines past and present criteria for excellence in architecture and the notable designs and designers who achieve this. Related fields such as urban design, landscape architecture, structural design, interior design, computer graphics, and professional practice will be included.

231 Architectural Elements and Principles  Fall. 2 credits. Architecture students must register concurrently in Architecture 201. Spring.
Theory of the order, perception, and function of architectural space. Discourse on the nature of architectural systems and the multiplicity of ways they can be used to solve architectural problems.

232 Design Methods and Programming  Spring. 2 credits. Architecture students must register for this course concurrently with Architecture 202.
Studios and lecs, T 1:30–3:25. W. Goehner.
Basic methods for developing architectural programs. Programming as a conceptual as well as a descriptive task is emphasized. Basic methods of design. Analytic and synthetic skills are stressed.

331 Special Problems in Principles, Theories, and Methods  Fall or spring. Variable credit (maximum, 3).
Prerequisite: permission of instructor.
Hours to be arranged. Staff. Independent study.

335 Theory of Architecture  Fall. 3 credits.
Prerequisite: Architecture 231–232 or permission of instructor. Not offered every year.

336 Theory of Architecture  Spring. 3 credits.
Limited to third-year students and above. Not offered every year.
Theories of modern architecture: De Stijl, cubist and "DOM-INO" theory.

337 Special Investigations in the Theory of Architecture I Fall or spring. Variable credit (maximum, 3).
Prerequisite: permission of instructor.
Hours to be arranged. Staff. Independent study.

338 Special Topics in the Theory of Architecture I Fall or spring. 3 credits. Prerequisite: permission of instructor.
Hours to be arranged. V. Warke and visiting faculty.
Topic to be announced before preregistration.

431 Theory of Architecture  Fall. 3 credits.
Prerequisite: third-year status. Not offered every year.
Gardening and architecture: urban parks; villas and country houses; and Italian, French, and English landscape gardens. Site planning.

432 Theory of Architecture  Spring. 3 credits.
Prerequisite: third-year status. Not offered every year.
The development of urban form, urban intervention, contextualism, ideal cities, historic new towns, streets, piazzas, fortifications, public buildings and social housing types, site planning, and transportation.

435 Architecture and Re-presentation  Fall. 3 credits. Limited to degree candidates in architecture.
Lecs. disc, and reviews, T R 2:30–4:30. V. Warke.
A study of architecture as it functions as a re-presentational art, referring to its past while inferring its present.

635 Critical Theory in Architecture  Spring. 3 credits. Prerequisite: permission of instructor.
Sem. hours to be arranged. V. Warke.
An inquiry into the fundamental principles of architectural criticism in theory and practice, with emphasis on the structures of criticism in the twentieth century.

637 Special Investigations in the Theory of Architecture II Fall or spring. 3 credits. Prerequisite: permission of instructor.
Hours to be arranged. V. Warke and visiting faculty.
Topic to be announced before preregistration.

639 Principles of Design Process  Fall or spring. 3 credits. Limited to third-year architecture students and above; students in other colleges must have permission of instructor. Not offered every year.
Analysis of the major theories and techniques of design developed during the past fifteen years, with special emphasis on application to the solution of whole problems in architectural design.

Note: 667–668 Architecture in Its Cultural Context I and II is accepted as a theory course. See the section "Architectural Science and Technology Courses" for description.

Design Communication

Darkroom fees for all photography courses (these fees are subject to change).
In-college students — $50 per term
Out-of-college students — $50 plus $10 per term course fee

151 (191) Drawing I  Fall. 2 credits.
Freehand drawing with emphasis on line and perspective representation of form and space.

152 (192) Drawing II  Spring. 2 credits. Prerequisite: Architecture 151.
Freehand drawing as a means of conceiving and expressing spatial form; line weight, shades and shadows, and figure drawing.

251 Introductory Photo I (also Art 161)  Fall or spring. 3 credits each term.
Hours to be arranged. Staff.
For description see Art 161.
351 Introductory Photo II (also Art 261) Spring. 3 credits. Prerequisites: Architecture 251 or Art 161, or permission of instructor. Hours to be arranged. Staff. For description see Art 261.

353 Large-Format Architectural Photography Spring. 3 credits. Prerequisites: Architecture 251 or Art 161 or 261, or permission of instructor. Darkroom fee, $30. May not be offered 1987–88. Lect and studio, hours to be arranged. Staff. The special uses of large-format view camera photography. Emphasis on the creative use of the view camera in architectural photography.

355 Graphic Design Studio Fall or spring. 3 credits. Prerequisite: Architecture 151 or 152, or permission of instructor. May not be offered 1987–88. Lect and studio, hours to be arranged. Staff. Design and preparation of materials for reproduction in print media. Studio in typography, available printing processes, and photomechanical methods of reproduction.

356 Architectural Simulation Techniques Fall or spring. 3 credits. Prerequisite: Architecture 151 or permission of instructor. Not offered 1987–88. Lect and studio, hours to be arranged. G. Hascup. Two- and three-dimensional simulation techniques in architecture. Emphasis on simulation of environment, space, materials, and lighting as visual tools for architectural design.

347 Special Project In Photography Fall or spring. Variable credit (maximum, 3). Prerequisites: written proposal outlining the special project and permission of instructor. Not offered 1987–88. Hours to be arranged. Staff. Independent study.

348 Special Project In Design Communication Fall or spring. Variable credit (maximum, 4). Limited to undergraduates. Prerequisite: written proposal outlining the special project and permission of instructor. Hours to be arranged. Staff. Independent study.

Architectural Science and Technology

160 The History of Architectural Technology Fall or spring. 3 credits. Not for students in the Department of Architecture. T Peters. Architectural technology is a seemingly illogical blend of scientific knowledge and empirical experience. Whereas it may seem chaotic to the nonprofessional, it is a product of logic in the widely differing areas of design, structure, installation, production and erection, material use, law, economics, and historical development. The evolution of this interdependence is treated using examples of architectural and civic engineering works and processes.

261 Environmental Controls—Site Planning Fall. 3 credits. Lecs, M W F 11:15. T Peters. The basic principles involved in design in the outdoor environment. A brief historical perspective. A development of inventory including grading and drainage. Foundations, surfacing, and construction.

Graduate Courses

671-762 Architectural Science Laboratory 761, fall; 762, spring. Six credits each term. Open to architectural science graduate students only. Hours to be arranged. Staff. Projects, exercises, and research in the architectural sciences.

763-764 Thesis or Research in Architectural Science 763, fall; 764, spring. Variable credit (maximum, 12). Limited to architectural science graduate students. Hours to be arranged. Independent study.

Architectural History

The history of the built domain is an integral part of all aspects of the architecture curriculum, from design and theory to science and technology. Incoming students take Architecture 181–182 in the first year, and two additional courses from the 380–390 series, preferably in the third and fourth years. Seminars are intended for advanced undergraduate and graduate students and do not satisfy undergraduate history requirements. Courses, seminars, and special investigations focus on the Western tradition, which constitutes the most immediate setting for contemporary practice. Building cultures from other parts of the world, often more extensive and far older than that of the West, are studied in special offerings as opportunities in faculty resources become available.

Sequence Courses

181 History of Architecture I Fall. 3 credits. Required of all first-year students in architecture; open to all students in other colleges with an interest in the history of the built domain. T R 11:15–1:10. Staff. The history of the built environment as social and cultural expression in Western civilization from earliest times to the present. In the fall, themes, theories, and ideas in ancient and medieval urban design are considered on the basis of selected instances from the civilization of Mesopotamia to the seventeenth century.

182 History of Architecture II Spring. 3 credits. Required of all first-year students in architecture. Open to all students in other colleges with an interest in the history of the built domain; may be taken independently of Architecture 181. T R 11:15–1:10. Staff. The history of the built environment as social and cultural expression in Western civilization from earliest times to the present. In the spring, themes, theories, and ideas are addressed in greater detail for architecture and urban design from the eighteenth century to the 1980s.

Freshman Writing Seminars

190 The Language of Architecture Fall or spring. 3 credits. Not for students in the Department of Architecture. Staff. The metaphor of language is used to discuss works of architecture both as formal objects and as carriers of meaning when seen in their cultural contexts. Contemporary and historical examples, including local buildings, are examined to develop skills in visual analysis and in "reading the messages" in architectural design.

191 The Literature of Architecture Fall or spring. 3 credits. Not for students in the Department of Architecture. Staff. The literature of architecture, understood as the testimony of the architects themselves, is drawn on to examine major themes of twentieth-century architecture. Texts are presented according to rhetorical models of thematic categories. For example, narrative, descriptive, and polemical readings address the birth of the skyscraper. Three salient themes in modern architecture are explored in the seminar: the impact of technology and revolution, the skyscraper and dwelling as new types for new needs, and the aesthetic of modern architecture.

Directed Electives

381 Architecture of the Classical World Spring. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered every year. Hours to be announced. Staff. The history of architecture and urban design in ancient Mediterranean civilizations, with emphasis on Greece and Rome. The course considers change and transformation of building types and their elements within the general context of social demands.

382 Architecture of the Middle Ages Fall. 4 credits. (Credit for this course may be obtained by taking History of Art 332.) Prerequisites: Architecture 181–182 or permission of instructor. M W F 12:20. R. G. Calkins. A survey of medieval architecture from the Early Christian period to the late Gothic (A.D. 300–1500). Emphasis is given to the development of structural systems, form, function, and meaning of important medieval buildings.

384 The Renaissance Fall. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered every year. T R 9:05–11. Staff. History of European architecture and city planning of the fifteenth and sixteenth centuries. Special consideration is given to building types and to internal changes in architecture and urban design, as well as to external influences such as social, economic, and political factors.

385 The Baroque 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered every year. T R 11:15–1:10. C. F. Otto. History, ideas, and theories of architecture and urban design in Europe between 1600 and 1800. Special consideration is given to the contribution and significance of major architects of the time.

386 English Architecture: 1688–1892 Fall. 3 credits. Hours to be arranged. C. Rowe and staff. An investigation of English architecture from the revolution of 1688 to the appearance of the parliamentary Labour party in 1892.

387 The Nineteenth Century Fall. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered every year. Hours to be announced. M. Woods and staff. Examination of the leading trends in Western architectural theory and practice from the rationalist traditions through art nouveau.

388 The Twentieth Century 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered 1987–88; next offered 1988. Hours to be announced. Staff.

Thesis Electives


391 American Architecture I Spring. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered 1987–88; next offered 1988–89. M W 9:05–11. M. Woods. The history, ideas, and theories of architecture and urban design in Europe and America during the course of the twentieth century, beginning with reform efforts of the 1890s and concluding with work from the 1980s.

392 American Architecture II Spring. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered 1987–88; next offered 1988–89. M W 9:05–11. M. Woods. The history, ideas, and theories of architecture and urban design in Europe and America during the course of the twentieth century, beginning with reform efforts of the 1890s and concluding with work from the 1980s.

393 The American Planning Tradition (also City and Regional Planning 462) Fall. 4 credits. Prerequisites: Architecture 181–182 or permission of instructor. Hours to be announced. Staff. A systematic review of American city planning history, beginning with the earliest colonial settlements and ending with the era of the New Deal. An introductory lecture course requiring no previous exposure to planning or architecture, and a prerequisite for students intending to take advanced seminars or independent studies in planning history.

396 Special Topics in Architectural History Spring. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered 1987–88; next offered 1988–89. Hours to be announced. Staff. Topic to be announced by preregistration.

397 Special Topics in Architectural History Fall. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered every year. Hours to be announced. C. F. Otto. Topic to be announced by preregistration.

Spring. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Not offered every year. Hours to be announced. M. Woods and staff. Topic to be announced by preregistration.

399 Special Topics in Architectural History Fall or spring. 3 credits. Limited to 30 students. Prerequisites: Architecture 181–182 or permission of instructor. Hours to be announced. Staff. Topic to be announced by preregistration.

Courses in Preservation

583 (543) Measured Drawing (also City and Regional Planning 567) Fall. 3 credits. For undergraduate architecture students and graduate students in history and preservation. Prerequisite: permission of instructor. Hours to be announced. M. A. Tomian. Combines study of architectural drawings as historical documents with exercises in preparing measured drawings of small buildings. Presents the basic techniques of studying, sketching, and measuring a building and the preparation of a finished drawing for publication.
584 (544) Problems in Contemporary Preservation Practice (also City and Regional Planning 563) Spring. Variable credit (maximum, 3). Hours to be announced. M. A. Tomlan. A review and critique of ongoing preservation projects and an investigation of areas of expertise currently being developed, presented by staff and guest lecturers.

585 (545) Perspectives on Preservation (also City and Regional Planning 562) Fall. 3 credits. Hours to be announced. M. A. Tomlan and visiting lecturers. Introductory course for preservation planning. The rationale for, and methods of, using existing cultural and aesthetic resources in the planning and design of regions and cities.

586 (546) Documentation for Preservation Planning (also City and Regional Planning 560) Fall. 3 credits. Hours to be announced. M. A. Tomlan and visiting lecturers. Methods of collecting, recording, processing, and analyzing historical architectural and planning materials.

587 (547) Building Materials Conservation (also City and Regional Planning 564) Spring. 3 credits. Open to juniors, seniors, and graduate students. Hours to be announced. M. A. Tomlan. A survey of the development of building materials in the United States, chiefly during the nineteenth and early twentieth centuries, and a review of the measures that might be taken to conserve them.

588 (548) Historic Preservation Planning Workshop: Surveys and Analyses (also City and Regional Planning 561) Fall or spring. 4 credits. Hours to be announced. Staff. Techniques for the preparation of surveys of historic structures and districts; identification of American architectural styles, focusing on upstate New York; explorations of local historical resources, funding sources, and organizational structures. Lectures and training sessions. Emphasis on fieldwork with individuals and community organizations.

Seminar in Architectural History

681 Seminar in the Architecture of the Classical World Fall or spring. 4 credits. Prerequisites: Architecture 381 or permission of instructor. Not offered every year. Hours to be announced. Staff. Issues in Greek and Roman architectural history. Specific topic to be announced.

684 Seminar in the Renaissance Fall or spring. 4 credits. Prerequisites: Architecture 384 or permission of instructor. Not offered every year. Hours to be announced. M. Kubelik. Issues in European architecture and city planning of the fifteenth and sixteenth centuries. Specific topic to be announced.

685 Seminar in the Baroque Fall or spring. 4 credits. Prerequisites: Architecture 385 or permission of instructor. Not offered every year. Hours to be announced. C. Otto. Special topics in the history of European architecture and urbanism between 1600 and 1800. Specific subject to be announced.

687 Seminar in Nineteenth-Century Architecture Fall or spring. 4 credits. Prerequisites: Architecture 387 or permission of instructor. Not offered every year. Hours to be announced. M. Woods and staff. Historical topics in European architecture and urbanism in the nineteenth century. Specific subject to be announced.

688 Seminar in Twentieth-Century Architecture Fall or spring. 4 credits. Prerequisites: Architecture 388 or permission of instructor. Not offered every year. Hours to be announced. C. Otto. Special topics in the history of architecture and urban design in Europe and America during the twentieth century. Specific subject to be announced.

690 Seminar in American Architecture Fall or spring. 4 credits. Prerequisites: Architecture 390–391 or permission of instructor. Not offered every year. Hours to be announced. M. Woods and staff. Historical topics in the architecture of the nineteenth and twentieth centuries in the United States. Specific subject to be announced.

693 Seminar in the History of American City Planning (also City and Regional Planning 660) Fall. 3 credits. Prerequisites: Architecture 393 or permission of instructor. Hours to be announced. Staff. A research seminar in which each student selects a topic for oral presentation followed by the completion of a research paper. Early sessions examine the scope of planning history, its relations to other disciplines, sources of written and graphic materials, and the uses of historical evidence in interpreting urban planning and development.

696 Seminar in the History of Architecture and Urban Development Fall or spring. 4 credits. Prerequisites: permission of instructor. Not offered every year. Hours to be announced. Staff. Topic to be announced.

697 Seminar in the History of Architecture and Urban Development Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year. Hours to be announced. M. Woods. Topic to be announced.

699 Seminar in the History of Architecture and Urban Development Fall or spring. 4 credits. Prerequisite: permission of instructor. Hours to be announced. M. Woods. Topic to be announced.

799 Graduate Independent Study in the History of Architecture and Urban Development Fall or spring. Variable credit. Prerequisite: permission of instructor. Hours to be announced. Staff. Independent study for graduate students.

899 Ph.D. Dissertation in History of Architecture and Urban Development Fall or spring. Variable credit. Hours to be announced. Staff. Independent study for the doctoral degree.

Undergraduate Program

The undergraduate curriculum in art, leading to the degree of Bachelor of Fine Arts, provides an opportunity for the student to combine a general liberal education with the studio concentration required for a professional degree. During the first three semesters all students follow a common course of study designed to provide a broad introduction to the arts and a basis for the intensive studio experience in the last three years. Beginning with the fourth term, students concentrate on painting, sculpture, photography, or printmaking. They may elect additional studio work in any of these subjects during the last two years, with the consent of the instructor; providing the courses are taken in sequence and at the hours scheduled. These courses are designed to promote a knowledge and critical understanding of these arts and to develop the individual student's talent. All members of the faculty in the Department of Art are active, practicing artists, whose work represents a broad range of expression.

Studio courses occupy approximately one-half of the student's time during the four years at Cornell; the remainder is devoted to a diversified program of academic subjects with a generous provision for electives.

The curriculum in art is an independent program of study within the College of Architecture, Art, and Planning. However, the intimate relationships between the fine arts and training in architecture and city planning is a source of special strength in the Cornell program and affords unusual benefits to the students in these three disciplines. Although the undergraduate curriculum in art is an excellent background for a career in applied art and offers courses in the use of graphics in modern communications, no specific technical courses are offered in such areas as interior design, fashion, or commercial art.

The department discourages accelerated graduation. However, a student may petition for consideration of early graduation by submission of a petition to the faculty before course enrollment in the spring semester of the student's junior year.

A candidate for the B.F.A. degree who also wants to earn a Bachelor of Arts degree from the College of Arts and Sciences can arrange to do so. This decision should be made early in the candidate's career (no later than the third semester), so that he or she can petition to be registered in both colleges simultaneously. Each student is assigned an adviser in the College of Arts and Sciences to provide needed guidance. Those students who are interested primarily in the history rather than in the practice of art should apply for admission to the College of Arts and Sciences with the objective of pursuing a major in the Department of History of Art in that college. Department of Art studio courses may then be taken as electives.

The B.F.A. program is designed so that students may fulfill the degree requirements of 130 credits with a minimum of 64 credits taken in the Department of Art and a minimum of 50 credits taken outside the department. Within these ranges, students may design their own programs subject to the following limitations:
1) Of the minimum of 50 elective credits to be taken outside the Department of Art, 12 credits must be in English, history, or other humanities offered in the College of Arts and Sciences. In the first two years 9 credits in history and 6 or 7 credits in an architectural history must be completed. An additional 12 credits in art history at the 200 level or higher or in architectural history must be completed in the last two years. Also, of the total 21 required credits must be in introduction to art history courses at the 200 level.

2) Students must also plan their programs to complete 30 credits in courses in one of the following studio areas: painting, sculpture, printmaking, or photography, or they should plan to complete 20 credits in each of two of the above areas. They should plan to complete all fourth-year studio concentration courses. Students must also complete a senior thesis in one area of concentration and are required to participate in the Senior Exhibition.

The university requirement of two terms in physical education must be met.

A candidate for the B.F.A. degree at Cornell is required to spend the last two terms of candidacy in residence at the university, subject to the conditions of the Cornell faculty legislation of November 14, 1962.

Students who transfer into the undergraduate degree program in art must complete a minimum of four terms in residence at Cornell and a minimum of 60 credits at the university, of which 30 credits must be taken in the Department of Art, including four terms of studio work. No student may study in absentia for more than two terms.

Curriculum

Students are expected to take an average course load of 16 credits per semester during their four years. They must complete a minimum of two courses each in painting, sculpture, printmaking, and photography and four in drawing by the end of the third year. All studio courses may be repeated for credit.

**First Year**

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<tr>
<th>Term</th>
<th>Credits</th>
<th>Courses</th>
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<tr>
<td>Fall Term</td>
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<td>110 Color, Form, and Space 3</td>
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<td>111 Introductory Art Seminar 1</td>
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<td>121 Introductory Painting 3</td>
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<td>141 Introductory Sculpture 3</td>
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<td>151 Introductory Drawing 3</td>
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<td>Spring Term</td>
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<td>131 Introductory Etching 3</td>
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<td>133 Introductory Lithography 3</td>
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<td>151 Introductory Drawing 3</td>
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<td>161 Introductory Photography 3</td>
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<td>Elective 3 or 4</td>
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<td>Second Year</td>
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<td>Art history elective 3 or 4</td>
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<td>Elective(s) 6 or 7</td>
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<td>Third Year</td>
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<td>Art history elective 3 or 4</td>
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**Fourth Year**

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<td>Spring Term</td>
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<td>Electives 5 or 6</td>
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**Course Information**

Most courses in the Department of Art are open to students in any college of the university who have fulfilled the prerequisites and who have permission of the instructor.

Fees are charged for all Department of Art courses. For fine arts majors the fee is $20 each semester. Students from outside the department are charged $10 a course. In addition, there are darkroom fees for all photography courses (these fees are subject to change): for in-college students the fee is $50 each semester, and for out-of-college students the fee is $50 plus $10 per term course fee.

In order to take advantage of the special opportunities afforded by summer study, the department has developed several summer-only courses. Students wanting to satisfy Cornell degree requirements may petition to have these courses substituted for fall- or spring-term required courses.

**Courses in Theory and Criticism**

110 Color, Form, and Space Fall or spring. 3 credits. Fall enrollment limited to B.F.A. candidates. M 9:30–11. N. Daly. A study of traditional and contemporary ways of drawing and painting. An analysis of color theory and pictorial space.

111 Introductory Art Seminar Fall. 1 credit. Limited to B.F.A. candidates. F 1:25–3. Students meet for one hour each week with a different member of the faculty. The varying artistic interests of the staff are presented and discussed.

311 Issues in Contemporary Art Fall. 3 credits. Prerequisite: third-year standing in Fine Arts Program. Hours to be arranged. S. Poleskie. A seminar course in issues of contemporary art, including lectures by visiting artists.

610 Seminar in Art Criticism Fall or spring. 2 credits; may be repeated for credit. Four terms required for M.F.A. candidates. Hours to be arranged. Staff. Historical and modern critical opinions and their relation to problems in the theory of art are studied.

**Studio Courses in Painting**

121 Introductory Painting Fall, spring, or summer. 3 credits. Hours to be arranged. Staff. An introduction to the problems of artistic expression through the study of pictorial composition, proportion, space, shapes, and color as applied to abstract and representational design.

123 Landscape Painting Summer. 3 credits. Class meets outdoors at selected sites in the Ithaca area. A different motif is explored each week. Pen, pencil, and water- or oil-based colors (optional) are the materials employed. Analysis and discussion of the landscape work of Corot, Cézanne, van Gogh, Seurat, and others are included.

221 Painting II Fall or spring. 3 credits. Prerequisite: Art 121 or permission of instructor. Hours to be arranged. Staff. A continuation of Art 121.

321 Painting III Fall. 4 credits. Prerequisite: Art 221 or permission of instructor. Hours to be arranged. Staff. Continued study of the principles of painting and the selection and expressive use of materials and media. Group discussions and individual criticism.

322 Painting IV Spring. 4 credits. Prerequisite: Art 321 or permission of instructor. Hours to be arranged. Staff. Continued study of the principles of painting and the selection and expressive use of materials and media. Group discussions and individual criticism.

421 Senior Thesis in Painting Fall or spring. 6 credits. Prerequisite: Art 322 or permission of instructor. Hours to be arranged. Staff. Further study of the art of painting through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

422 Senior Thesis in Graphic Arts Fall or spring. 6 credits. Prerequisite: Art 321 or 322 or permission of instructor. Hours to be arranged. Staff. Advanced painting project to demonstrate creative ability and technical proficiency.

721–722, 821–822 Graduate Painting 721 and 821, fall; 722 and 822, spring. Credit as assigned. May be repeated for credit. Limited to M.F.A. students in painting. Staff. Students are responsible, under staff direction, for planning their own projects and selecting the media in which they are to work. All members of the staff are available for individual consultation.

**Studio Courses in Graphic Arts**

131 Introductory Intaglio Fall, spring, or summer. 3 credits. Hours to be arranged. E. Meyer. A basic introduction to etching techniques, with emphasis on engraving, lift ground, relief printing, monotypes, and experimental techniques.

132 Introductory Graphics Fall, spring, or summer. 3 credits. Hours to be arranged. S. Poleskie. An introduction to the two-dimensional thought process and the language of vision. Students will explore design projects and the use of graphic materials, including collage, pochoir, and screen printing.

133 Introductory Lithography Fall, spring, or summer. 3 credits. Hours to be arranged. G. Page. The theory and practice of lithographic printing, using limestone block and aluminum plate. Basic lithographic techniques of crayon, wash, and transfer drawing are studied.

231 Intaglio Printing II Fall or spring. 3 credits. Prerequisite: Art 131 or permission of instructor. Hours to be arranged. E. Meyer. Further study of the technique of intaglio printing, with emphasis on techniques and color.

232 Silk-Screen Printing Spring. 3 credits. Prerequisite: Art 132 or permission of instructor. Hours to be arranged. S. Poleskie. Silk-screen printing, including photographic stencils, three-dimensional printing, and printing on metal, plastic, and textiles.

233 Lithography II Fall or spring. 3 credits. Prerequisite: Art 133 or permission of instructor. Hours to be arranged. G. Page. Continuation of the study and practice of lithographic printing, with emphasis on color.
331 Printmaking III Fall or spring. 4 credits. Prerequisite: Art 231, 232, or 233 or permission of instructor. Hours to be arranged. Staff. Study of the art of graphics through both assigned and independent projects. Work may concentrate in any one of the graphic media or in a combination of media.

332 Printmaking IV Fall. 4 credits. Prerequisite: Art 331 or permission of instructor. Hours to be arranged. Staff. Continuation and expansion of Art 331.

333 Printmaking V Spring. 6 credits. Prerequisites: Art 332 or permission of instructor. Hours to be arranged. Staff. Further study of the art of graphics through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

432 Senior Thesis in Printmaking Fall or spring. 6 credits. Prerequisite: Art 331 or 332 or permission of instructor. Hours to be arranged. Staff. Advanced printmaking project to demonstrate creative ability and technical proficiency.

731–732, 831–832 Graduate Printmaking 731 and 831, fall and 732 and 832, spring. Credit as assigned; may be repeated for credit. Limited to M.F.A. candidates in graphic arts. Prerequisite: permission of instructor. Staff. Students are responsible, under staff direction, for planning their own projects and selecting the media in which they will work. Members of the staff are available for consultation; discussion sessions of work in progress are held.

Studio Courses in Sculpture

141 Introductory Sculpture Fall, spring, or summer. 3 credits. Hours to be arranged. Staff. A series of studio problems introduce the student to the basic considerations of artistic expression through three-dimensional design, i.e., modeling in Plasteline, building directly in plaster, casting in plaster, and constructing in wood and metal.

241 Sculpture II Fall or spring. 3 credits. Prerequisites: Art 141 or permission of instructor. Hours to be arranged. Staff. Various materials, including clay, plaster, wood, stone, and metal, are used for exercises involving figurative modeling, abstract carving, and other aspects of three-dimensional form and design. Beginning in the second year, students are encouraged to explore the bronze casting process. The sculpture program, which is housed in its own building, contains a fully equipped bronze casting foundry.

341 Sculpture III Fall. 4 credits. Prerequisite: Art 241 or permission of instructor. Hours to be arranged. Staff. Continued study of the principles of sculpture and the selection and expressive use of materials and media. Group discussions and individual criticism.

342 Sculpture IV Spring. 4 credits. Prerequisite: Art 241 or permission of instructor. Hours to be arranged. Staff. Continuation and expansion of Art 341.

441 Sculpture V Fall. 6 credits. Prerequisite: Art 342 or permission of instructor. Hours to be arranged. Staff. Further study of the art of sculpture through both assigned and independent projects executed in various media. Instruction through group discussions and individual criticism.

442 Senior Thesis in Sculpture Fall or spring. 6 credits. Prerequisite: Art 341 or 342 or permission of instructor. Hours to be arranged. Staff. Advanced sculpture project to demonstrate creative ability and technical proficiency.

741–742, 841–842 Graduate Sculpture 741 and 841, fall; 742 and 842, spring. Credit as assigned; may be repeated for credit. Limited to M.F.A. students in sculpture. Staff. Students are responsible, under staff direction, for planning their own projects and selecting the media in which they are to work. All members of the staff are available for individual consultation. Weekly discussion sessions of works in progress are held.

Studio Courses in Photography

Darkroom fees for all photography courses (these fees are subject to change):
- In-college students—$50 per term
- Out-of-college students—$50 plus $10 per term course fee.

161 Introductory Photography I (also Architecture 251) Fall, spring, or summer. 3 credits. Hours to be arranged. Staff. A basic lecture-studio course in black and white photography for beginners. Emphasis is on basic camera skills, darkroom techniques, and understanding of photography imagery.

168 Black-and-White Photography Summer. 3 credits. Fee, $60. Intended for students at all levels, from introductory to advanced. Emphasis on camera skills, darkroom techniques, and the content of black-and-white photographic imagery.

169 Color Photography Summer. 3 credits. Fee, $60. Intended for students at all levels, from introductory to advanced. Emphasis on camera skills, darkroom techniques, and the content of color photographic imagery.

261 Photography II (also Architecture 351) Fall, spring, or summer. 3 credits. Prerequisites: Art 161 or Architecture 251, or permission of instructor. Hours to be arranged. Staff. A continuation of Introductory Photography I.

263 Color Photography Fall or spring. 3 credits. Prerequisite: Art 161 or permission of instructor. Hours to be arranged. Staff. A studio course in color photographic processes, including color film developing and color printing. Emphasis is on camera skill, color techniques, image content, and creative use of color photography.

264 Photo Processes Fall or spring. 3 credits. Prerequisite: Art 161 or permission of instructor. Hours to be arranged. Staff. A studio course in alternate and nonsilver photographic processes. Emphasis is on camera skill, basic techniques and processes, image content, and creative use of photo processes.

265 Large-Format Photography Fall or spring. 3 credits. Prerequisite: Art 161 or permission of instructor. Hours to be arranged. Staff. A studio course in the use of large-format cameras, with emphasis on both creative use of materials and equipment.

361 Photography III Fall or summer. 4 credits. A studio course intended for photography majors and other qualified students. Prerequisite: Art 261, 262, or 263 or permission of instructor. Hours to be arranged. Staff. A continuation of Art 261. Further study of the art of photography, with emphasis on specialized individual projects.

362 Photography IV Spring. 4 credits. A studio course intended for photography majors and other qualified students. Prerequisite: Art 361 or permission of instructor. Hours to be arranged. Staff. A continuation of Art 361.

397 Independent Studio Summer Credit by arrangement. Hours by arrangement. Staff. Students who have the interest and ability to progress beyond the problems of their particular course may register for additional credits. Students plan courses of study or projects that must meet the approval of the instructors they have selected to guide their progress and criticize the results. A course fee may be charged.

461 Photography V Fall. 6 credits. Prerequisite: Art 361 or permission of instructor. Hours to be arranged. Staff. A studio course intended for photography majors and other qualified students.

462 Senior Thesis in Photography Fall or spring. 6 credits. Prerequisite: Art 361 or 362 or permission of instructor. Hours to be arranged. Staff. A studio course intended for photography majors and other qualified students. Advanced photography project to demonstrate creative ability and technical proficiency.

751–752, 851–852 Graduate Photography 751 and 851, fall; 752 and 852, spring. Credit as assigned. May be repeated for credit. Limited to M.F.A. students in photography. Prerequisite: permission of instructor. Staff. Students are responsible, under staff direction, for planning their own projects and selecting the media in which they will work. Members of the staff are available for consultation. Discussion sessions of work in progress are held.

Studio Courses in Drawing

151 Introductory Drawing Fall, spring, or summer. 3 credits. Hours to be arranged. Staff. A basic drawing course in the study of form and techniques. Contemporary and historical examples of figure, still life, and landscape drawing are analyzed in discussion.

158 Conceptual Drawing Summer. 3 credits. Emphasis on drawing from the imagination. The generation of ideas and their development in sketches is stressed. The intent is not to produce finished art but rather to experience a series of problems that require image and design concepts different from those of the artist working directly from nature.

159 Life and Still-Life Drawing Summer. 3 credits. The human figure and still life are studied both as isolated phenomena and in relation to their environment. Focuses on helping the student observe and discover.

251 Drawing II Fall or spring. 3 credits. Prerequisites: Art 151 or permission of instructor. Hours to be arranged. Staff. A continuation of Art 151 but with a closer analysis of the structure of the figure and a wider exploitation of its purely pictorial qualities.

[351 Drawing III Fall or spring. 3 credits. Prerequisite: Art 251. Not offered 1977–88. Staff.]

Graduate Thesis

712 Graduate Thesis Spring. Credit as assigned. Staff. For graduate students in their last term in the programs in painting, sculpture, printmaking, and photography.
Special Studio Courses


371 Independent Studio Fall, spring, or summer. Variable credit (maximum, 5). Students may register for two studios in a semester. May be repeated for credit. Prerequisite: written permission of instructor. Department staff.

372 Special Topics in Art Studio Fall, spring, or summer. Variable credit (maximum, 6). Hours to be arranged. Staff. An exploration of a particular theme or project.

471 Independent Studio Fall, spring, or summer. Variable credit (maximum, 5). Students may register for two studios in a semester. May be repeated for credit. Prerequisite: written permission of instructor. Department staff.

City and Regional Planning


The department offers several programs of study at both the undergraduate and graduate levels.

The Undergraduate Program in Urban and Regional Studies

The four-year Bachelor of Science program in urban and regional studies offers students an opportunity to direct their education toward an understanding of urban problems and solutions. The curriculum acquaints students with the physical, social, political, economic, and environmental forces that confront cities and regions and contribute to their growth and decline. The curriculum draws on strengths in the department and is supplemented by course work in related areas in other departments at Cornell.

The first two years in this program are a general education in the liberal arts and sciences. Writing and quantitative skills are developed, and an exposure is provided to course work in the natural and social sciences, the expressive or design arts, and the humanities. Two introductory courses in urban and regional issues are also taken during the first two years. During the junior and senior years ten specific courses are taken to provide a significant foundation of knowledge in the major. Additional directed electives will permit the student to gain greater depth of knowledge and acquire a broader understanding of topics of individual interest. These courses may be in any related subject, including, for example, housing, urban design, neighborhoods, energy, environmental controls, economic development, architecture, land use, social policy, and international planning.

Basic Requirements for Graduation

1) General education (during the first four terms)
   a. Freshman writing seminars: 6 credits
   b. Foreign language: qualification in one foreign language
   c. An approved course sequence (minimum of 6 credits) in each of the four categories below: 30 credits
      1. a. Biological sciences or
      b. Physical sciences
      2. a. Social sciences (other than economics) or
      b. History
      3. a. Humanities or
      b. Expressive arts or design arts
      4. Mathematics
      5. Economics

2) Major concentration: 50 to 52 credits
   a. Specific course requirements (38 to 40 credits)
      CRP 100, The American City
      CRP 101, The Global City
      CRP 314, Planning, Power, and Decision Making, or Government 311, Urban Politics
      CRP 314, The Progressive City
      CRP 320, Introduction to Quantitative Methods I
      CRP 321, Introduction to Quantitative Methods II
      CRP 361, Seminar in American Urban History, or History 332 or 333, The Urbanization of American Society
      CRP 400, Introduction to Urban and Regional Theory
      CRP 401, Urban Political Economy
      CRP 480, Environmental Politics
      CRP 481, Principles of Spatial Design and Aesthetics
      CRP 482, Urban Land Use Concepts
   b. Directed electives (related to urban and regional studies): 12 credits (at least 6 credits to be taken outside CRP)

3) Free electives: 26 to 28 credits
   a. 12 credits during first four terms
   b. 14 to 16 credits during last four terms

Required courses for graduation: 34 Required credits: 120

The university requirement of two terms of physical education must be met during the first two terms.

Honors Program

Each year a small number of well-qualified junior-year students will be accepted into the honors program. Each honors student will develop and write a thesis under the guidance of his or her faculty adviser. There will be a seventy-five-page limit on each honors thesis.

Off-Campus Opportunities

Cornell-in-Washington program. Students in good standing may be eligible to earn degree credits in the Cornell-in-Washington program through course work at an urban-oriented internship in Washington, D.C. Students may work as interns with congressional offices, executive branch agencies, interest groups, research institutions, and other organizations involved in the political process and public policy. Students also select one or two other seminars from such fields as government, history, economics, human development and family studies, architectural history, and agricultural economics. All seminars are taught by Cornell faculty members and carry appropriate credit towards fulfillment of major, distribution, and other academic requirements.

Cornell Abroad. Cornell encourages qualified undergraduates to study abroad in the belief that an international perspective is an important component of a good education. In an increasingly interdependent world, the experience of living and learning in a foreign country is invaluable. With this in mind, the university is continuing to develop study abroad opportunities. Current programs are available in Great Britain, Spain, and Germany. Under development are others in Asia, the Middle East, and France. The department encourages its students to explore these opportunities.

Research and fieldwork. Students are welcome to work with department faculty members on research or other opportunities that are appropriate to their particular interests. Many fieldwork and community-service options also exist for students in the Urban and Regional Studies Program.

Additional Degree Options

Linked degree options. Urban and regional studies students have the opportunity to earn both a Bachelor of Science degree and a Master of Regional Planning (M.R.P.) degree. Ordinarily the professional M.R.P. degree requires two years of work beyond that for the bachelor's degree. This arrangement shortens that time by about one year. A minimum of 30 credits and a master's thesis or thesis project are required for the M.R.P. degree. Students apply to the Graduate School, usually in the senior year.

Dual degree option. A student in the Cornell College of Arts and Sciences currently can earn both a B.A. in an arts college major, plus a B.S. in urban and regional studies in a total of five years. Special requirements have been established for this dual degree program. The student should complete the undergraduate program should contact either the director of the Urban and Regional Studies Program or the appropriate dean of the College of Arts and Sciences for further information.

Admissions Requirements and Procedures

Among the most important criteria for admission to the Urban and Regional Studies Program are intellectual potential and commitment—a combination of ability, achievement, motivation, diligence, and use of educational and social opportunities. Nonacademic qualifications are important as well. The department encourages students with outstanding personal qualities, initiative, and leadership ability. Above all, the department seeks students with a high level of enthusiasm and depth of interest in the study of urban and regional issues. Applicants must complete a university admission application.

Transfer Students

In most cases, transfer applicants should no longer be affiliated with a high school and should have completed no fewer than 12 credits of college or university work at the time of application. A high school student who has completed graduation requirements at midyear and is taking college courses for the rest of the academic year should apply as a freshman. Prospective candidates who believe that their circumstances are exceptional should consult with the director of admissions in the Cornell division of interest to them before filing an application.

Forms for transfer application and financial aid are available from the Cornell University Office of Admissions, 410 Thurston Avenue, Ithaca, New York 14850-2488. Official transcripts of all high school and college work must be submitted along with SAT or ACT scores and letters of recommendation.

It is desirable for prospective transfers to have taken at least 6 credits in English. In addition, students should have taken basic college-level courses distributed across the natural and social sciences, humanities, and mathematics. Those applicants whose previous course work closely parallels the general education portion of the urban and regional studies curriculum will have relative ease in transfer. However, as there are no specific requirements for transfer, students with other academic backgrounds, such as engineering, architecture, fine arts, management, and agriculture, are eligible to apply.

Although an interview is not required, applicants are urged to visit the campus. Applicants who want further information regarding urban and regional studies may contact Professor Richard S. Booth, Program Director, Urban and Regional Studies, Cornell University, 106 West Sibley Hall, Ithaca, New York 14853-6701 (telephone: 607/255-4331).
The Graduate Program in City and Regional Planning

Planning seeks to guide the development of the economic, social, natural, and built environments in order that some of the needs and aspirations of people may be better satisfied. Most of the activities in the program focus on a broad range of issues that are often submerged under the labels of urban, regional, or social-policy planning. There is overlap among these three areas of professional and scholarly study, and the department encourages the integration of related planning activities.

Land use and urban development planning is concerned with physical facilities; the social, economic, and environmental forces that affect their design; and the process of development, plan making, and administration.

History and historic preservation planning is a special program of study preparing students for work in history, analysis, and preservation of buildings, urban environments, and neighborhoods, including downtown business areas.

Regional planning and regional science are concerned with socioeconomic issues and functional planning at the regional level, the forces that generate economic growth and social development, and the ways in which resources can best be used.

Local economic policy is concerned with understanding and influencing how economic change may be harnessed to the benefit of communities, counteracting plant closings and more general regional decline and stimulating more equitable programs of socioeconomic change and development.

Social policy is concerned with the social decision processes involved in planning.

International planning offers a broad range of courses in international economic development, development planning, and political economy.

Analytical methods courses are offered to prepare planners and researchers for a variety of situations and problems.

Planning theory and political economy courses examine the organizational and planning processes and the political and economic conditions in which planning and international development operate.

Several graduate degrees are offered: the Ph.D.; the Master of Regional Planning (M.R.P.), for a two-year program; the Master of Arts (M.A.) in historic preservation planning, for a two-year program; and, in special cases, the Master of Professional Studies (International Development) [M.P.S. (I.D.)], for the twelve-month international planning program.

Course Information

Most courses in the Department of City and Regional Planning are open to students in any college of the university who have fulfilled the prerequisites and have the permission of the instructor. The department attempts to offer courses according to the information that follows. However, students should check with the department at the beginning of each semester for late changes.

Undergraduate Program in Urban and Regional Studies

101 The American City Fall. 3 credits.

An introductory course on the urban problems and opportunities facing the majority of this country's population as we approach the last decade of the twentieth century. Readings, discussions, and brief papers exploring topics ranging from suburban development to central city poverty, from environmental threats to downtown revitalization, and from municipal finance to the new position of women in the urban economy.

102 The Global City: People, Production, and Planning in the Third World Spring. 3 credits. T R 10:10—11:25. P. Opadewa. A critical look at the physical and social development of giant cities in the Third World. Their origins, roles, contributions, and shortcomings are examined. Their place in world political economy is evaluated. Policy prescriptions for their principle problems are discussed.

108 Environment and Society: The Delicate Balance Fall. 3 credits. M W F 11:15. R. Booth. This freshman seminar addresses the delicate balance that must be maintained between societal needs and demands and environmental quality. It uses several important texts that examine and challenge society's widespread and deep-rooted tendencies to ignore the social, economic, and environmental consequences of degrading the natural environment. Students work extensively on improving writing skills.

109 Freshman Writing Seminar Spring. 3 credits. Hours to be arranged. Staff. Topic to be announced.

218 Women's Work and Labor Markets Spring. 3 credits. T R 3:35—5:30. L. Beneria. The emphasis in this course will be on the economic aspects of women and work: What are the consequences of women's concentration in reproductive work? What economic role does domestic work play within the larger economy? What are the consequences of occupational segregation by gender? Why is the wage gap between men and women not disappearing? What is the role of discrimination? What is the condition of women in other countries? Throughout the course we will examine different analytical frameworks and distinguish between different feminist perspectives dealing with those questions.

314 Planning, Power, and Decision Making Fall. 3 credits. M 1:25—3:20. J. Forester. This seminar examines various bases of political and professional power. We ask, What do professionals who want to serve the public need to know about power and decision-making processes in the institutional settings in which they operate? How and why can professionals make a difference when facing problems characterized by great complexity and severe inequalities among affected groups?

315 The Progressive City Spring. 3 credits. T R 1:25—3:30. P. Clavel. A review of attempts to incorporate the interest of working-class and poor constituencies through majority control of local governments. Topics to be covered include the role of the city in class formation; historical perspectives on urban political administration, contemporary populist, socialist, and progressive urban governments; and the search for an economic basis for progressive reform.

320 Introduction to Quantitative Methods I Fall. 3 credits. M W F 3:35—5:00. S. Saltzman or staff. An introduction to the role and use of quantitative methods in the study of urban and regional issues. Emphasis will be on statistical, mathematical, and computer social science methodologies, analysis and testing of hypotheses and models of social, economic, and physical phenomena of cities and regions. The first semester will cover applicable methods in probability, descriptive statistics, estimation, hypothesis testing, and regression.

321 Introduction to Quantitative Methods II Spring. 3 credits. M W 3:35—5. S. Saltzman or staff. A continuation of City and Regional Planning 320. The second semester will focus on other methods commonly used to analyze urban and regional phenomena, including techniques for decision analysis, linear programming, and cost–benefit analysis and simulation, among others. Strengths and weaknesses of those methods will also be considered.

361 Seminar in American Urban History (also CRP 662) Spring. 3 credits. Prerequisite: permission of instructor. T 10:10—12:05. I. R. Stewart. Seminar in the historical evolution of the American city. Emphasis on factors in urban growth, the process of urbanization, the urban reform movement, and intellectual and social responses to the city.

400 Introduction to Urban and Regional Theory Fall. 4 credits. Open to juniors and seniors. M W F 11:15. B. G. Jones. Introductory review of theories dealing with the spatial distribution of population and economic activity. drawn from various social science disciplines such as geography, economics, and sociology. Review of recent research dealing with such topics as population distribution, migration, location of industry and economic activity, and the spatial organization of urban and regional systems.

404 Urban Economics (also CRP 604) Fall. 4 credits. Prerequisite: basic economics. T 10:10—12:05. S. Czamanski. Urban phenomena are analyzed from an economic point of view. Areas examined include economic aspects of urbanization processes and policies, determinants of urban growth and decline, urban land and housing markets, urban transportation, and urban public services. Some time will be spent in discussing problems of cities in developing countries.

413 Planning and Political Economy I Fall. 4 credits. T 1:25—3:20. Staff. This course deals with Marx's methodological approach to urban problems and his elaborations in volume one of Capital. Topics will cover Marx's method, the labor theory of value, the labor process and surplus value, absolute and relative surplus value, the general law of capital accumulation, and the transition from feudalism to capitalism. Basic texts will be supplemented with readings and discussion about current urban problems.

414 Planning and Political Economy II Spring. 4 credits. Prerequisites: students must have read volume one of Capital and be generally familiar with Marx's approach. T 1:25—3:20. Staff. This course is an introduction to volumes two and three of Capital and his Theories of Surplus Value. Discussion of selected topics among the circulation of capital, productive and unproductive labor, reproduction schemes, accumulation, the transformation of surplus value into profits, the transformation of value into prices of production, the tendency of the rate of profit to fall, and crises. Emphasis on interpretation of current urban problems.

415 Gender Issues in Planning and Architecture Spring. 3 or 4 credits. T R 10:10—11:25. S. Christopherson. In this course we will examine the role of gender in relation to urban policy, regional planning, and architecture. The course has two major objectives: (1) to provide a theoretical and empirical context for understanding how gender influences the form and allocation of space and (2) to explore concrete ways to address and ameliorate gender inequalities in the practice of planning and architecture.

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321 Introduction to Quantitative Methods II Spring. 3 credits. M W 3:35—5. S. Saltzman or staff. A continuation of City and Regional Planning 320. The second semester will focus on other methods commonly used to analyze urban and regional phenomena, including techniques for decision analysis, linear programming, and cost–benefit analysis and simulation, among others. Strengths and weaknesses of those methods will also be considered.

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are design methods and applications in the contemporary urban context of Europe and North America.

490 Student-Faculty Research Fall or spring. 1–4 credits. Limited to undergraduates in the Urban and Regional Studies Program. S-U grades only. Hours to be arranged. Staff. Research, readings, and design project in which a student and faculty member choose a topic related to urban and regional studies.

492 Honors Thesis Research Fall or spring. 4 credits. Limited to Urban and Regional Studies Program majors who have been selected as honors students by the department faculty. Hours to be arranged. Staff. Each selected student works with his or her thesis adviser.

493 Honors Thesis Writing Fall or spring. 4 credits. Prerequisite: Completion of CRP 492. Hours to be arranged. Staff. Each selected student works with his or her thesis adviser.

495 Special Topics Fall or spring. 3 credits. Hours to be arranged. Staff.

Graduate Courses and Seminars

Courses numbers from 500 to 599 and 600 to 699 are offered to graduate students only, unless restrictions noted. Students taking undergraduate courses are numbered from 300 to 499. Students may register for any number of units; the number of units may not be changed during the term. Students may register for any number of units per credit.

500 Urban and Regional Theory Spring. 4 credits. Prerequisite: intermediate-level economics or sociology, or CRP 400. T R 3:35–5:30. W. W. Goldsmith. A review of attempts by the various social sciences to understand the contemporary city and its problems, particularly as seen by planners. Material is drawn from urban and regional economics, human ecology, urban sociology, psychology, anthropology, and geography in order to explain the location, size, form, and functioning of cities. Traditional and contemporary critical theory is examined as it applies to physical, social, and economic problems of the modern city. Major texts will be read, criticized, and discussed in seminars.

501 Introduction to Economics and Political Economy Fall. 2 or 4 credits. F 4:30–6:30, alternate S 10–12. T. Vietorisz. This course introduces students to the fundamentals of economics from the user's point of view. The course compares two major schools of thought that take a conflicting approach to political-economic problems of society: the mainstream school of traditional economics and the Marxian school of political economy. Concrete planning problems, with which the course illustrates theoretical points, appear in a very different light from these two perspectives. The course provides bases for independent judgment in assessing conflicting interpretations likely to be encountered in students' professional careers.

511 Concepts and Issues in Planning Practice Fall. 4 credits. T 3:35–5:30. P. C. Ciaccia. A seminar for graduate students and others interested in an in-depth introduction to the main ideas and concepts that underlie the practice of city and regional planning. Weekly discussions will focus on selected articles and books. Interrelations between national, state, and local practices and policies, and developments in methodology, organization, and the political environment, will be explored.

512 Introduction to Planning Theory Spring. 4 credits. M 11:15–1:10. J. Forester. Planning is a form of social intervention. It parallels and complements other important decision-making institutions such as voting, interest-group bargaining, and market exchange. This course provides cases and analysis describing examples of alternative forms of planning and the various arguments used to justify planning. Market failure, democratic participation, advocacy, and expert judgment. Political, organizational, and practical-ethical aspects of planning practice are explored. The course covers the work of Dyckman, Piven, Knuthmold, Marcuse, Lindboom, Friedmann, March, and others.

513 Political Economy of Women and Work 1 Fall. 4 credits. W 7–10 p.m. L. Beneria. This course deals with the question of how to understand and analyze the economic condition of women. Starting with general issues about the "question of origins," reproduction, and production, it then deals with different approaches to the analysis of women's work in the household and in the labor market. The empirical material will mostly concentrate on the United States, with some glances at other industrialized countries and the international economy.

514 Political Economy of Women and Work 2 Spring. 4 credits. W 7–10 p.m. L. Beneria. Continuation of CRP 513. Focusing mostly on Third World countries, this course deals with the impact of economic development on women. In particular it deals with how changing economic structures affect household organization, labor-market dynamics, the division of labor, and women's condition in different societies. Topics include the analysis of current international development, such as the commoditization of life, globalisation of production, the crisis of development, population growth, and foreign debt.

515 Gender Issues in Planning and Architecture (also CRP 415) Spring. 3 or 4 credits. T R 10:10–11:25. S. Christopherson. In this course we will examine the role of gender in relation to urban policy, regional planning, and architecture. The course has two major objectives: (1) to provide a theoretical and empirical context for understanding how and why gender is produced and distributed in the form and allocation of space and (2) to explore concrete ways to address and ameliorate gender inequalities in the practice of planning and architecture.

520 Mathematical Concepts for Planning Fall. 1–4 credits. Prerequisite: Permission of instructor. Mathematics 201 and Sociology 420 are acceptable substitutes for this course. T R 9:05. Staff. Intended for students having little or no background in college mathematics. Basic concepts in matrix algebra, calculus, and probability are covered in self-contained units of one credit each. Students may register for any or all of these topics.

521 Introduction to Computers in Planning (also CRP 421) Fall. 4 credits. T R 10.00. Staff. An introduction to the use of microcomputers in the problem-solving and planning processes. Students run programs using PL/1 or another appropriate programming language and various program packages. Brief introduction to computer systems and software. Advantages and limitations of using computers are considered.

541 The Politics of Technical Decisions (also Government 628 and Sociology 515) Fall. 4 credits. Cosponsored by the Program on Science, Technology, and Society. W 2:30–4:25. D. Nelkin. Political aspects of decision making in technical areas. Drawing from recent risk disputes, we will examine the
origins and characteristics of "technical politics," the role of experts in government, and the problem of expertise in a democratic system. Alternatives to current decision-making procedures are explored.

542 The Politics of Technical Decisions II (also Government 629) Spring. 4 credits. Prerequisite: CRP 541 or permission of instructors. Cosponsored by the Program on Science, Technology, and Society. Hours to be arranged. D. Nelnik. A continuation of City and Regional Planning 541, focusing on political aspects of decision making in technical areas. Drawing from recent research and debates, we will examine the origins and characteristics of "technical politics," the role of experts in government, and the problem of expertise in a democratic system.

545 Introduction to Public Policy Analysis and Management Fall or spring. 3 credits. Not offered 1987–88. S. Saltzman. Introduction to systematic methods and processes for analyzing issues and problems of public policy and management. Roles of economic analysis and of analytic techniques in public sector decision making will be reviewed, with their respective strengths and weaknesses evaluated. Applications to a variety of public sector problem areas will be explored.

546 Conflict Resolution in the Public Sector Fall. 3 credits. T 1:30–3:20, R 10:10–12:05. J. Forester. This course will explore the theories and techniques of conflict resolution that are appropriate to the public sector. We will consider principles and strategies of negotiation, mediation, and collaborative problem solving. Authors to be read include Axelrod, Pruitt, Rubin, Raiffa, Fisher, Ury, and Susskind.

552 Urban Land-Use Planning I Fall. 3 credits. TR 2:30–3:30. S. Stein. Surveys, analyses, and plan-making techniques for guiding physical development of urban areas; location requirements, space needs, and interrelations of land uses. Emphasis on residential, commercial, and industrial activities and community facilities; housing and neighborhood conditions. Lectures, seminars, and field exercises.

553 Urban Land-Use Planning II Spring. 3 credits. Prerequisite: CRP 552 or permission of instructor. TR 12:20. Staff. In-depth consideration of special issues in urban land-use planning, such as industrial districts, large-scale integrated development, Planned Unit Development, public and institutional facilities, open space, land banking, central business districts, neighborhoods, energy impacts, transportation impacts, and others.

554 Introduction to Planning Design Fall. 3 credits. TR 12:20. Staff. Lectures, seminars, readings, and design exercises explore basic concepts and issues related to urban planning, urban design, site planning, and environmental awareness. Emphasis is on professional practice. Intended for students without design backgrounds, but others may enroll.

555 Urban Systems Studio (also Landscape Architecture 602) Spring. 6 credits. Prerequisites: permission of instructor. MT R 1:25–4:25. R. T. Trancik. Application of urban-design and town-planning techniques to specific contemporary problems of city environments. Issues of urbanism are investigated and applied to physical design interventions involving the street, square, block, garden, and park systems. Topics covered in the studio include urban land-use development, and spatial systems and aesthetics and public and private implementation of urban-design plans. This is a specially arranged collaborative studio with the Landscape Architecture Program.

556 Built-Environment Education Workshop Spring. 4 credits. Fieldwork hours to be arranged. S. Stein. Interdisciplinary teams of students from planning, architecture, landscape architecture, historic preservation, and other environmental design disciplines work in classrooms with schoolchildren and teachers to deepen their understanding of the built environment and to encourage their participation in the shaping of their own environment. Work in local schools is emphasized.

557 Small-Town Community Design Workshop Fall or spring. 2 or 4 credits. Fieldwork hours to be arranged. S. Stein. An in-depth approach to specific problems facing the small town or small city. Various aspects of planning, historic preservation, landscape architecture, and design, including "Main Street" revitalization, streetscape planning, storefront rehabilitation, signage, and comprehensive planning, are explored in a workshop setting. Working with real clients in nearby communities.

560 Documentation for Preservation (also Architecture 586) Fall. 3 credits. M 2:30–5:30. M. A. Tomlan. Methods of identifying, recording, collecting, processing, and analyzing information dealing with historic and architecturally significant structures, sites, and objects.

561 Historic Preservation Planning Workshop: Surveys and Analyses (also Architecture 588) Fall or spring. 4 credits. Fall, T 2:30–5:30, spring, T 2:30–5:30. Staff. Techniques for the preparation of surveys of historic structures and districts; identification of American architectural styles, focusing on upstate New York; and explorations of local historical resources, funding sources, and organizational structures. Lectures and training sessions. Emphasis on fieldwork with individuals and community organizations.

562 Perspectives on Preservation (also Architecture 585) Fall. 3 credits. T 1:25–4:25. M. A. Tomlan. Introductory course for preservationists. A survey of the historical development of preservation activity in Europe and America leading to a contemporary comparative overview. Field trips to notable sites and districts.


564 Building Materials Conservation (also Architecture 587) Spring. 3 credits. Open to juniors, seniors, and graduate students. R 12:20–2:15. M. A. Tomlan. A survey of the development of building materials in the United States, chiefly during the nineteenth and early twentieth centuries, and a review of the measures that might be taken to conserve them.

565 Fieldwork or Workshop in History and Preservation Fall or spring. Variable credit. M W 7–9 p.m. M. A. Tomlan. Work on applied problems in history and preservation planning in a field or laboratory setting or both.

567 Measured Drawing (also Architecture 583) Fall. 3 credits. For undergraduate architecture students and graduate students in history and preservation. Prerequisites: permission of instructor. R F 11:15–1:10. M. A. Tomlan. Combines study of architectural drawing as historical documents with exercises in preparing measured drawings of small buildings. Presents the basic techniques of studying, sketching, and measuring a building and the preparation of a finished drawing for publication.

568 Introduction to American Decorative Arts and Historic Interiors Spring. 3 credits. W 2:30–4:25. I. R. Stewart. An introductory survey of the design and evolution of domestic furnishings and related utilitarian objects made in or imported for use in America from 1670 to 1900. Categories to be covered include furniture, glass, ceramics, metals, prints, and textiles. Objects of national significance as well as common items created in relation to and outside the major urban style centers will be covered.

604 Urban Economics (also CRP 404) Fall. 4 credits. Prerequisites: basic economics. T 10:10–12:05. S. Czamanski. Urban phenomena are analyzed from an economic point of view. Areas examined include economic aspects of urbanization processes and policies, determinants of urban growth and decline, urban land and housing markets, urban transportation, and urban public services. Some time will be spent in discussing problems of cities in developing countries.

609 Special Topics in Urban and Regional Theory Fall or spring. 1–4 credits. Hours to be announced. Staff.

615 The Politics of Planning (Fall. 4 credits. Not offered 1987–88. P. Cavel.)

619 Special Topics in Planning Theory and Politics Fall or spring. 1–4 credits. Hours to be arranged. Staff.

620 Planning Analysis Spring. 4 credits. Lec., M W F 10:10; lab, to be arranged. B. G. Jones. A survey of commonly used techniques for analyzing various aspects of subnational socioeconomic systems. Emphasizes planning applications.

621 Planning Research Methods Fall. 3 credits. S-U grading only. W 2:30–4:25. S. Christopherson. For master's degree students, to write thesis project proposals. Four parts: theory, formulation of research questions, field work, and working hypothesis, guide to methods and techniques in social science research, and the role of the expert. The final proposal must also be approved by the thesis adviser.

622 Information Systems and Microcomputers for Planning and Policy Analysis Spring. 3 credits. Prerequisite: CRP 521 or equivalent, or permission of instructor. T 1:25–3:20. S. Saltzman. An introduction to the design and use of computer-based information systems for planning and policy analysis. The focus of the course will be on the design and use of data-base systems for organizing, storing, retrieving, and analyzing information using microcomputers and, secondarily, mainframe computers. Applications of information systems in public and not-for-profit institutions will be reviewed. Students will be expected to complete a term project on a microcomputer using an appropriate programming language.

624 Statistical Analysis for Planning and Public Policy I Fall. 3 credits. Prerequisites: CRP 520 or equivalent and permission of instructor. M W 3:30–5:30. S. Saltzman. An introduction to basic methods of statistical analysis, with an emphasis on their use in the decision-making process in planning. Material in descriptive statistics, sampling, estimation, hypothesis testing, and regression will be introduced.

City and Regional Planning
A group policy analysis exercise in an upstate New York Local Economic Policy—Field Workshop. The politics and administration of economic development programs. Theory case studies and policy issues treating the evolution of local development efforts in the transition from the high-growth post—World War II economy to contemporary and classic situations of regional decline.

Local Economic Policy—Field Workshop Spring. 4 credits. W 3:35–5:30. P. Clavel. A group policy analysis exercise in an upstate New York City. Students do a combination of data analysis; interviews with labor, business, and public leaders; and problem papers addressed to current issues presented by a client group. Individual work is synthesized into a comprehensive report at the end of the semester.

Special Topics in Regional Development Planning Fall or spring. 1–4 credits. Hours to be arranged. Staff.

Critical Theory and the Foundation of Planning Analysis Spring. 4 credits. R 11:10–1:10. J. Forester. Problems of social action are studied in the traditions following Marx, Weber, and Durkheim. Analyses of reproduction and resistance, normative order and power, meaning systems, and organizational action provide the bases for a consideration of Habermas’s synthetic critical communications theory of society. Implications for planning practice, education, and research are drawn.

Special Topics in Social-Policy Planning Fall or spring. 1–4 credits. Hours to be arranged. Staff.

The Urban Development Process Fall. 2 credits. Enrollment limited. R 12:20–2:15. I. R. Stewart. Examination of the goals, strategies, methods, and achievements of major participants in the urban land and building market: landowners, speculators, real estate brokers, developers, bankers, lawyers, nonprofit builders, and government agencies. Primarily visiting speakers.

Legal Aspects of Land-Use Planning Spring. 3 credits. M W F 9:05. R. S. Booth. Survey of leading cases and legal concepts in land-use planning, with particular attention to zoning, subdivision control, condemnation, and growth-control issues.

Real Estate Development I: Analysis and Critique Fall. 4 credits. Limited to 20 students with permission of instructor. Prerequisite: Hotel Administration 300 or equivalent or permission of instructor. T R 10:20–1:10. S. Stein. The course will investigate many aspects of real estate development. Areas covered will include acquisition, finance, valuation, construction, design and marketing, and the interplay of those variables.

Real Estate Development II: Advanced Analysis and Critique Spring. 4 credits. Limited to 20 students with permission of instructor. Prerequisites: CRP 654 or equivalent. Not offered 1987–88. Staff. A continuation of City and Regional Planning 654.

Land Resources Protection Law Fall. 3 credits. M W F 9:05. R. Booth. Examines legal issues raised by government efforts to protect critical land resources such as tidal wetlands, flood plains, forests and agricultural lands, and large resource areas such as the coastal zone. Students will use a broad selection of legal materials and learn to use the basic resources of a law library.

Special Topics in Urban Development Planning Fall or spring. 1–4 credits. Hours to be arranged. Staff.

Seminar in the History of American City Planning (also Architecture 693) Fall. 3 credits. Prerequisites: CRP 462 or permission of instructor. M 1:25–3:20. J. W. Reps. A research seminar in which each student selects a topic for oral presentation followed by the completion of a research paper. Early sessions examine the scope of planning history, its relations to other disciplines, sources of data and graphic materials, and the uses of historical evidence in interpreting urban planning and development.

Historic Preservation Planning Workshop: Plans and Programs Fall or spring. 1–4 credits. Prerequisite: CRP 561. F 2:30–5:30. Staff. Preparation of elements of historic preservation plans: designs, legislation, and special studies. Individual or group projects are selected by students. Fieldwork is emphasized.

Seminar in American Urban History (also CRP 361) Spring. 3 credits. Prerequisite: permission of instructor. T 10:10–12:05. I. R. Stewart. Seminar in the historic evolution of the American city Emphasis on factors in urban growth, the process of urbanization, urban reform movement, and intellectual and social responses to the city.

Historic Preservation Law Spring. 3 credits. Offered alternate years. M W F 9:05. R. Booth. Lecture on historic districts and landmark designation, tools for preservation (such as police power, taxation, eminent domain), and recent developments in state and federal historic preservation mandates.

Economics and Financing of Neighborhood Conservation and Preservation Fall. 3 credits. W 1:25–3:20. B. G. Jones. The economic and financial aspects of historic preservation and neighborhood conservation. Topics include public finance, selected issues in urban economics, real estate economics, and private financing of real estate projects.

Preservation Planning and Urban Change Fall. 3 credits. T 11:10–1:10. I. R. Stewart. An examination of fundamental planning concepts and issues as they relate to historic preservation. Neighborhood revitalization, federal housing programs, the role of public and private institutions, displacement, and other social issues are among the primary topics.

Special Topics in History and Preservation Fall or spring. 1–4 credits. Hours to be arranged. Staff.

Regional Planning and Development in Developing Nations Fall. 4 credits. Prerequisite: second-year graduate standing. R 2:30–5. W. W. Goldsmith. Extensive case studies of development planning are analyzed. Focus is on a Marxist critique of the process of regional development through urbanization and in particular on the concepts of equity and efficiency, external economies, export linkages, and internal self-sufficiency and integration. Resource development, national integration, human development, and migration problems are discussed.

Seminar in International Planning Spring. 1 credit. S-U grades only. F 12:20–1:35. P. O'Lpawala.

Economics of Regional Development Spring. 2 or 4 credits. F 4:30–6:30. Alternate S 10–12. T. Vietorisz. This course deals with the historical process of regional and metropolitan development, emphasizing Third World problems. While its basic approach is mode-of-production analysis, it also critically surveys location, comparative advantage, and feedback system theories. Development is interpreted as the penetration of the capitalist mode of production into precapitalist societies. Its features are analyzed both in terms of the historical context, the role of institutions (such as the market mechanism), imperialism, multinational) and in terms of the pre-existing (feudal, Asiatic precapitalist mode of production. Regional and urban development planning problems are discussed in the light of the contradictions of the above process, as well as in the context of newly emerging Third World socialist countries.

Special Topics in Planning and Developing Regions Fall or spring. 1–4 credits.
Seminar in Project Planning in Developing Countries  Spring. 3 credits.
An examination of the problems and issues involved in preparing project proposals for funding agencies. Topics include technical design, financial feasibility, social impact analysis, and policy relevance, as well as techniques for effective presentation of proposals. The course is organized as a seminar-workshop providing both an analysis of the critical elements of effective proposals and an opportunity to use those elements in the preparation of proposals. A multidisciplinary perspective is emphasized.

Science, Technology, and Development  Fall. 3 credits. Offered alternate years.
The place and role of science and technology as a factor in socioeconomic growth is examined with special reference to developing regions. The social underpinnings and linkages of science and technology are studied and their role explored as a nonneutral and dynamic social force that primarily serves the ends of particular social groups and societies. Current issues such as technological development, technology transfer, and appropriateness of technology are discussed in this context, with attention given to both rural and industrial development. Third World science and technology policy-planning options are considered throughout the course.

Transnational corporations are studied in the context of socioeconomic development. Contesting theories of the international firm are examined as a starting point for evaluating contradictory claims and counterclaims of proponents and detractors of transnational corporations. Advantages and disadvantages for developing regions are considered and Third World planning and policy options discussed on an ongoing basis.

K. C. Parsons.
The national urban development policy and planning efforts of selected developing countries are examined in the context of urbanization theory and national spatial planning. Recent descriptive and critical literature is explored. Topics include secondary cities policies, national and urban transportation planning, city planning, and sites and services project planning, housing, land policy, and urban development control systems.

Theories of Development and Underdevelopment  Spring. 3 credits.
Various theories attempting to analyze and explain the phenomena of underdevelopment are examined. Although a range of thought and approaches are considered, the accent is on aspects of political economy revolving around concepts of class and exploitation. Topics include the transition to capitalism; dependent and uneven development; various issues of growth and fluctuations under contemporary capitalism; including crises; rural and industrial development in less-developed countries; and planning for development.

Professional Planning Colloquium I  Fall. 1 credit.
F 12:20–2. Staff.
Visiting lecturers treat problems and opportunities in the practice of planning. Local topic is to be announced. The only formal requirements for the course are attendance and a brief evaluation at the semester’s end.

Master’s Thesis, Project, or Research Paper  Fall or spring. 1–10 credits.
Hours to be arranged. Staff.

Planning Internships  Fall, spring, or summer. 1–12 credits.
Hours to be arranged. Staff.
Combines a professional planning internship in a metropolitan area with academic study to provide experience and understanding of the planner’s role in formulating and implementing plans and policies. Salaried internships in federal or state agencies, legislative offices, and comparable settings include development of research, analysis, and other technical skills. Work-study seminars draw on student field experiences, assigned readings, and guest speakers to examine current issues of federal, urban, and regional policy from the perspective of planning practice.

Master’s Thesis in Preservation Planning  Fall or spring. 1–6 credits.
Hours to be arranged. Staff.

Professional Writing and Publishing  Fall or spring. 2 credits. S-U grades only.
Individual and group projects culminating in the production of a professional journal.

Advanced Seminar in Urban and Regional Theory I  Fall. 3 credits. Prerequisite: CRP 500.
The theory of urban spatial organization. Economic, technological, and social factors leading to urbanization and various kinds of spatial organizations are explored. Major theoretical contributions to the understanding of intraregional and intrametropolitan distribution of population and economic activity are reviewed.

Advanced Seminar in Urban and Regional Theory II  Spring. 3 credits. Prerequisite: CRP 800.
A continuation of City and Regional Planning 800, concentrating on recent developments.

Advanced Planning Theory  Fall. 3 credits. Prerequisite: CRP 500 or 710.
A survey of the works of scholars who have contributed to current thinking about planning theory. Alternative assumptions concerning models of man and theoretical concepts concerning the nature of planning today are considered.

Planning Research Seminar I  Fall or spring. 2 credits.
W 12:20. Staff.
Intended for doctoral candidates in city and regional planning; other students welcome. Presentation and discussion of current problem areas and research by advanced doctoral students, faculty members, and visitors.

Doctoral Dissertation  Fall or spring. 1–12 credits.
Hours to be arranged. Staff.

Landscape Architecture  The Landscape Architecture Program at Cornell is jointly sponsored by the College of Agriculture and Life Sciences (in association with the Department of Floriculture and Ornamental Horticulture) and the College of Architecture, Art, and Planning.


Advanced Project Design and Graphics  Fall. 6 credits.
Intermediate design and technical skills. Weekly seminars draw on student field experiences, assigned readings, and guest speakers to examine current issues of federal, urban, and regional policy from the perspective of planning practice.

Course Information  *100 Landscape Architecture Freshman Orientation  Fall. 1 credit. M. I. Adleman.

140 Landscape Design Studio  Spring. 4 credits.
Limited to approximately 15 students; primarily for nonmajors. Course numbered 4 credits.

201 Theory and Application Studio  Fall. 6 credits. M. I. Adleman.

202 Project Design and Site Planning Studio  Spring. 6 credits. T. H. Johnson.

205 Graphic Communication  Fall. 3 credits. T. H. Johnson.

220 Principles of Spatial Design and Aesthetics (also CRP 461)  Fall. 3 credits. R. T. Trancik.

301 Natural Systems and Planting Design Studio  Fall. 6 credits. Prerequisite: LA 202 with a grade of C or better. Lab fee $20; cost of drafting supplies, about $100; expenses for field trip, about $200.

302 Urban Landscape Systems Studio  Spring. 6 credits. Prerequisite: LA 301 with a grade of C or better. Lab fee $20; cost of drafting supplies, about $100.

Projects in landscape architecture at the site scale as determined by constraints and opportunities of an urban environment. Emphasis on integration of site and historical analysis in formulation of physical design solutions.

310 Site Construction  Spring. 4 credits. P. J. Trowbridge.

312 Site Engineering for Landscape Architects  Spring. 4 credits. M. I. Adleman.

400 Professional Practice  Fall. 2 credits.
Examination of the landscape architecture profession, including office practices and organization, client-practitioner relationships, and documentation for project proposals and job specifications. Class format includes guest lecturers and field trips.

401 Advanced Project Design and Graphics Studio  Fall. 6 credits. R. T. Trancik.

*Offered through the College of Agriculture and Life Sciences.
**402 - Senior Project Studio** Spring. 6 credits. M. I. Adelman.

**490 - Special Topics in Landscape Architecture** Fall or spring. 1–3 credits; may be repeated for credit. S-U grades optional. Staff. Topical subjects in landscape architectural design, theory, history, or technology. Group study of topics not considered in other courses.

**497 - Independent Study in Landscape Architecture** Fall or spring. 1–5 credits; may be repeated for credit. S-U grades optional. Staff. Work on special topics by individuals or small groups.

**500 - Graduate Orientation Seminar** Fall. 1 credit. W. D. 20. D. W. Krall. Presentation and discussion of work of Cornell faculty members in and related to the field of Landscape Architecture.

**501 - Theory and Application Studio** Fall. 6 credits. Lab fee, $20; cost of basic drafting equipment and supplies, about $200; expenses for field trip, about $300. Lects, M W F 1:25; studios, M W F 2:30–4:25. Required 5-day field trip. L. Minir. Introduction to basic concepts of site analysis and physical design of landscape. Exercises and projects explore the relationship between natural features, functional demands, professional traditions, and the creation of spatial form.

**502 - Project Design and Site Planning Studio** Spring. 6 credits. Limited to graduate students. Cost of drafting supplies, about $100. Lects, M W F 1:25; studios, M W F 2:30–4:25. D. W. Krall. The studio will focus on the spatial design of project-scale site development. Students will develop their expertise in applying the design theory, vocabulary, and graphic expression introduced in LA 501.

**520 - Contemporary Issues in Landscape Architecture** Fall. 2 credits. S-U grades only. Lect. F 11:15–1:10. L. Minir. Presentations on topics that are current and significant to the environmental design and planning fields. Issues are discussed from a landscape architecture point of view by practitioners and researchers representing a range of professions.

**521 - History of European Landscape Architecture** Spring. 3 credits. Lect, T R 11:15: discs to be arranged. L. Minir. A survey from classical times to the present, emphasizing design principles and techniques that have established the landscape architecture tradition in Europe. Particular reference is made to the manner in which environments such as gardens, streets, plazas, parks, and new towns reflect in their built form a range of response to demands of culture, economics, technology, security, the law, and ecology.

**522 - History of American Landscape Architecture** Fall. 3 credits. Lects, T R 11:15: discs to be arranged. L. Minir. Landscape architecture in the United States from Jefferson to the present is examined as a unique expression of the American experience. Influences exerted by the physical landscape, the frontier and utopian spirit, and the cultural assumptions of democracy and capitalism are traced as they affect the forms of urban parks, private and corporate estates, public housing, transportation planning, national parks, and other open-space designs.

*Offered through the College of Agriculture and Life Sciences.

**531 - Regional Landscape Planning I** Fall. 4 credits. A. S. Lieberman.

**532 - Regional Landscape Planning II** Spring. 3 credits. Not offered 1987–88. Staff.

**601 - Natural Systems and Planting Design Studio** Fall. 6 credits. P. J. Towndridge.

**602 - Urban Systems Studio (also CRP 555)** Spring. 6 credits. R. T. Trancik and staff.

**611 - Site Engineering for Landscape Architects** Fall. 4 credits. M. I. Adelman.

**621 - Summer Internship Seminar** Fall. 2 credits. S-U grades only. Hours to be arranged. L. Minir. Presentation and discussion of projects developed during summer internships.

**634 - Landscape Architectural Research** Spring. 3 credits. T. H. Johnson.

**650 - Fieldwork or Workshop in Landscape Architecture** Fall or spring. 1–5 credits; may be repeated for credit. S-U grades optional. L. Minir. Work on applied problems in landscape architecture in a field or studio setting or both.

**690 - Independent Study in Landscape Ecology and Regional Landscape Planning** Fall. 1–3 credits. A. S. Lieberman.

**701 - Advanced Project Design Studio** Fall. 6 credits. T. H. Johnson.

**800 - Master's Thesis in Landscape Architecture** Fall or spring. 9 credits. Hours to be arranged. Staff. Independent research under faculty guidance, leading to the development of a comprehensive and defensible design or study related to the field of landscape architecture. Work is expected to be completed in the final semester of residency.

**Faculty Roster**

Singer, Arnold. Prof., Art
Squier, Jack L., M.F.A., Cornell U. Prof., Art
Stein, Stuart W., M.C.P., Massachusetts Inst. of Technology Prof., City and Regional Planning
Stewart, Ian R., Ph.D., Cornell U. Assoc. Prof., City and Regional Planning
Tomian, Michael A., Ph.D., Cornell U. Asst. Prof., City and Regional Planning
Ungers, O. Mathias, Diploma, Technical U. Karlsruhe (Germany) Prof., Architecture
Vietorisz, Thomas, Ph.D., Massachusetts Inst. of Technology. Adjunct Prof., City and Regional Planning
Warke, Val K., M.Arch., Harvard U. Assoc. Prof., Architecture
Wells, Jerry A., B.Arch., U. of Texas. Nathaniel and Margaret Owings Distinguished Alumni Professor of Architecture, Architecture
Woods, Mary N., Ph.D., Columbia U. Asst. Prof., Architecture
Zissovici, John, M.Arch., Cornell U., Asst. Prof., Architecture
College of Arts and Sciences

Program of Study

Introduction
The College of Arts and Sciences at Cornell is a traditional liberal arts college. It is composed of those departments that teach and study the humanities, the basic sciences, mathematics, the social sciences, and the expressive arts. It is also a college within a university, and this wider community provides strength and diversity not available in an isolated undergraduate institution. Students may draw upon the knowledge and facilities of the other undergraduate colleges at Cornell to supplement their studies. Finally, the college is a graduate school and research center attracting faculty whose writing and research require first-rate academic facilities and whose participation in undergraduate teaching brings to their students the most current ideas in their disciplines. It is this abundant variety that gives the college its distinctive character.

The richness of the curriculum is extraordinary; there is no course that all students must take, and there are several hundred from which they may choose. By choosing courses each semester, students design their own education. They achieve a balance between developing known interests and exploring new subjects. They sharpen their verbal and quantitative skills. They also come to understand more thoroughly our common Western tradition and learn something about the non-Western world and its peoples. An education in the liberal arts means honing one’s critical capacities, learning more about oneself in nature and culture, and gaining real experience of views of the world radically unlike one’s own. All this is highly individual, and the college relies on each student and faculty adviser to select sensible, challenging, and appropriate courses.

Yet the faculty believes that each student’s education should have certain common qualities. These include fostering the abilities to communicate in oral and written forms and to think critically and creatively. In addition, to these general areas of knowledge, students study foreign languages, acquire effective writing skills, and concentrate on one particular field to develop, as fully as possible, the powers of imaginative and critical thinking. To accomplish these objectives, the college has certain requirements for graduation.

Summary of Basic College Requirements for Graduation

1) Freshman Writing Seminars: Two.
2) Foreign language: Up to four courses to obtain qualification in two languages or proficiency in one.
3) Distribution: Four approved sequences of two full-semester courses (6–8 credits).
4) Major
5) Electives: Four or five courses (or 15 credits) in courses not used to fulfill other requirements and not in the major field.
6) Residence: Eight full-time semesters, unless a student can successfully complete the other requirements in fewer than eight semesters and is allowed to accelerate graduation.
7) Minimum number of courses: Thirty-four courses.
8) Credits: A total of 120 credits, of which 100 must be taken in the College of Arts and Sciences.
9) Physical education: Completion of the university requirement. See p. 21.

Freshman Writing Seminars
See "John S. Knight Writing Program," p. 10.

Language Requirement
The faculty considers competence in a foreign language essential for an educated person. Studying another language helps students understand language itself, our fundamental intellectual tool, and opens another culture for exploration. The sooner the student acquires competence, the more useful it will be. Hence work toward the foreign language requirement should be undertaken in the freshman and sophomore years.

The following departments teach foreign languages or literature or both in the College of Arts and Sciences: Africana Studies and Research Center, Asian Studies, Classics, German Literature, Modern Languages and Linguistics, Near Eastern Studies, Romance Studies, and Russian Literature.

The language requirement may be satisfied in one of two ways:
1) by attaining proficiency in one language or
2) by attaining qualification in two languages.

Proficiency
Proficiency is attained by passing a 200-level course (or Chinese or Japanese 161) or by equivalent achievement, to be determined by examination; see below under "Advanced Standing Credit."

Qualification
Qualification may be attained in any of the following four ways:
1) Three years of high school study in any one language gives qualification in that language. Note, however, that this route to qualification does not guarantee entrance into a 200-level course. The student who wants to continue in this language must be placed by examination.
2) Passing the requisite course: 102, 123, or 134 in languages taught by the Department of Modern Languages and Linguistics; Chinese or Japanese 160, Japanese 141 – 142 – 241; Near Eastern Studies 102 or 122 in Hebrew; 102 in elementary classical Arabic; or 214 in Egyptian Arabic; Classics 103 or 104 in Greek; Classics 106 or 107 or 108 in Latin; AS&RC 134 in Swahili.
3) A score of 560 or better on the College Placement Test (CPT).
4) Placement in a 200-level course by special examination (in cases where no CPT is available).

A student may submit a 560 CPT score at the end of a course numbered 122, thus attaining qualification without taking 123. This procedure is optional, and no credit will be awarded for their bilingual ability. Their achievement scores are eligible for the courses listed in the charts below, depending on their CPT scores. For other languages, or for special problems, students should see the professor in charge.

French

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<th>CPT</th>
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<td>Below 450</td>
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<td>650 and above</td>
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Applying for the Cornell Advanced Standing Examination (CASE)

German

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Applying for the Cornell Advanced Standing Examination (CASE)

Italian

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Applying for the Cornell Advanced Standing Examination (CASE)

Russian

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<td>650 and above</td>
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Applying for the Cornell Advanced Standing Examination (CASE)

The type of examination depends upon the language courses and the level of achievement:

1) French, German, Italian, Russian, and Spanish courses: CPT. Entering students who have not taken the CPT in high school and who want to continue their language study must take the CPT at Cornell during orientation week. Students may retake this examination at Cornell if they have studied the language a year or more since last taking the test. In order to do this, students register with the Academic and Career Counseling services, 203 Barnes Hall, and pay a fee of $5.

2) Latin (all courses except 105 and 107): departmental examination.

3) Greek (all courses except 101, 104, and 111): departmental examination.

4) Arabic: departmental examination.

5) Hebrew: departmental examination.

6) Other languages: special examinations; see the professor in charge.

7) High achievement (students with a CPT score of 650 or better in French, German, Hebrew, Italian, Russian, and Spanish): the Cornell Advanced Standing Examination (CASE).

An entering or continuing student with high achievement scores should take the Cornell Advanced Standing Examination (CASE); even if the student does not want to do any further work in the language, the CASE may provide proficiency status for the language requirement, and it may provide up to 6 advanced standing credits. Students who do not have high achievement scores are eligible for the courses listed in the charts above, depending on their CPT scores. For other languages, or for special problems, students should see the professor in charge.
Advanced Standing Credit

Advanced standing credit may be entered on a student’s record as follows.

Credit may be granted for high school work for the equivalent of language courses numbered 203, 204. The amount of credit is based on performance on one or more of the following examinations.

a. CPT Advanced Placement Examination.

French, Spanish, and German: A score of 4 or 5 yields 3 credits on the French, Spanish, or German language examinations and literature examinations. Hungarian: A score of 6 credits may be granted, depending on the student’s score on the departmental examination.

Latin: Students should consult the Department of Classics, 120A Goldwin Smith Hall. Students may be tentatively placed in a 300-level Latin course if they achieve a score of 4 or 5 on the CPT Advanced Placement Examination, but they must also take the department’s own placement examination during orientation week. A student who is permitted to register in a 300-level course will be given 6 advanced standing credits.

Greek: For information concerning advanced placement, students should consult the chairman of the Department of Classics, 120A Goldwin Smith Hall.

b. Cornell Advanced Standing Examination (CASE).

To be eligible for this examination the student must have achieved a score of 650 on the CPT. For details on registration, see “Language Course Placement and Credit,” above. The maximum amount of credit granted is 6 credits.

c. Special examinations are given for languages where no CPT exists.

Distribution Requirement

The purposes of the distribution requirement are to acquaint students with a broad range of subject matter in the liberal arts and to provide them with the opportunity to explore new areas.

Accomplishing these purposes is part of the task of freshmen and sophomores. Although completion of the requirements may be spread over the eight semesters, successful introductory course work can be followed up with advanced courses only if undertaken early. For purposes of distribution, subjects are divided into four groups. Each of the first three groups has two subdivisions.

Group 1

a. Physical sciences
b. Biological sciences

Group 2

a. Social sciences
b. History

Group 3

a. Humanities
b. Expressive arts
Science 100 or 211 may be used for three of these credits. The mathematics distribution requirement is also satisfied by a score of 3 on the CEEB calculus BC examination. Mathematics 109 and Education 005 and 115 (College of Agriculture and Life Sciences) do not count toward satisfying the requirement.

b. An Unused Subdivision

A sequence of courses in any one of the subdivisions in groups 1–3 that has not been used to fill that group's requirement.

The Major

In their last two years, students devote roughly one-half their time to acquiring depth and competence in a major subject. The choice of major is not intended to define a student's education or to lead to a lifetime's occupation, although it may do so. By majoring, students do advanced work and focus the full extent of their imaginative and intellectual capacities on something they care about, sharpening their minds in the process.

Students must be accepted by departments as majors before registering for courses for the junior year. Most departments and programs specify certain preparatory courses as a basis for admission to their major. Students should consult the departmental listings on the following pages. A department may refuse to accept into the major any student whose performance does not meet departmental standards. To seek admission into a major, students take a copy of their transcript to an appointment with the director of undergraduate studies in their prospective major department.

Available majors. Majors are offered by each of the departments except the Department of Astronomy. There are also majors in Africana studies, American studies, archaeology, biology and society, dance, German area studies, Russian and Soviet studies, and social relations. Some students want to pursue an interest that cannot be met within an established major. They may plan, with the help of their faculty advisor, an independent major that includes courses from several departments. Students are responsible for completing their majors according to the regulations of their departments.

Electives

Of the thirty-four courses and 120 credits required for graduation, almost one-third are free electives. How students use these electives frequently makes the difference between an ordinary and a truly interesting curriculum. Students must complete four or five 3- or 4-credit courses in courses that are offered outside the major field and are not used to fill another requirement. Students may group electives to form a concentration within one discipline or about a topic in several disciplines. Some choose to explore a variety of subjects. Electives taken in other divisions of the university may be used to gain practical training or specialized knowledge. Some students develop a concentration in one particular department or subject outside arts and sciences.

Residence

The college expects its students to earn credits toward the degree during full-time study at Cornell, normally for eight semesters. A full semester in an approved program of study abroad, a fieldwork program, the sea Semester, or Cornell-in-Washington, which the college encourages, is considered a semester of residence at Cornell. Students occasionally enter with advanced placement credit (this does not include advanced placement credit from the CPT program, for which regular Cornell credit is granted), take leaves and complete courses at other institutions, or take summer courses. The college will accept up to 20 credits from other institutions as part of the out-of-college electives if the appropriate departments at Cornell approve. (This excludes, of course, approved study abroad and in absentia programs, for which up to 30 credits will be accepted, and credits earned by transfer students at their first university.)

However, credits earned at other institutions may not normally be substituted for the final two semesters. Nor may students leave the college after three or three and a half years and come back with credits accumulated at other institutions or through Cornell Summer Session. Students are not allowed to be part-time students during their eight regular semesters unless they meet the criteria described in the section "Part-Time Study and Pro-Rata Tuition," or present convincing academic or medical reasons for part-time study.

Ninth term. Students may spend a ninth term in residence. They should discuss their program with the assistant dean for seniors and must notify the college in writing of their intention. Students receiving financial aid should discuss funding with an adviser in the Office of Financial Aid.

Acceleration

Earning a Bachelor of Arts degree from the College of Arts and Sciences normally takes eight semesters. Even with careful planning, a student can meet in fewer semesters, the college expects that students will remain eight semesters to take full advantage of the resources of the university to obtain a full liberal arts education. Fewer than 10 percent of the students in the college graduate in fewer than eight semesters. They do this in several ways: (a) by bringing advanced placement credit that allows them to condense the first two years and begin advanced study before the third year, (b) by completing courses in Cornell Summer Session, (c) by taking more than the average number of credits each semester. Students who plan to accelerate their graduation should be accepted into their majors early so that they can spend four full semesters in upper-level work and develop their course of study with their major adviser. Accelerants may not finish their degrees in summer session. Students planning to accelerate present petitions by the beginning of the junior year to the Office of Records and Scheduling. 46 Goldwin Smith Hall. Late petitions will be reviewed by the Committee on Academic Records and may not be approved. Accelerants must, of course, satisfy all the requirements for graduation. In addition, they must have at least a B average by the time they graduate.

Minimum Number of Courses and Credits

Students must complete at least thirty-four courses to graduate, that is, four or five courses a semester. A 3- or 4-credit course counts as one course; a 2-credit course counts as one-half course. Single-credit courses do not count as part of the thirty-four except in certain cases when they form a part of a series (certain offerings in biology and music, for instance) and two in the same series can be aggregated to count as one-half course. A 6-credit language courses counts as 1½ courses, while the summer Falcon Programs in Asian languages count as 10 credits and 2½ courses each. Biology 364, 6 credits, counts as one course. Students must also complete 120 credits, 100 of which must be from courses taken in the College of Arts and Sciences, to earn the Bachelor of Arts degree. Credits earned from advanced placement examinations, courses approved for study abroad, and courses taken in certain off-campus residential programs may be counted towards the 100 credits required within the college and also toward the required thirty-four courses. Credits earned in other colleges at Cornell, or in any subject at United States institutions other than Cornell, do not count as part of the 100. The only exception is for courses (usually no more than three) that a department accepts from other colleges at Cornell as part of the core of their major.

98 Arts and Sciences


Asian Studies: Any two courses in Asian art, literature, or religion given by the Department of Asian Studies or listed there under the areas of China, Japan, South Asia, and Southeast Asia, excluding the three-week writing seminars and courses given outside the College of Arts and Sciences. A reasonable sequence is formed by taking any two courses in the same area. Any two of Asian Studies 211, 212, 215, and 220 may satisfy this requirement. Alternative sequences will, under special circumstances, be considered but require the permission of the director of undergraduate studies.

Classics: (a) any two courses in Greek beginning with 201 or in Latin beginning with 205 that form a reasonable sequence, or (b) any two of the following: Classics 206, 211, 212, 217, 218, 219, 220, 221, 222, 224, 225, 232, 233, 236, 237, 238, 245, 300, 309, 319, 320, 321, 322, 323, 326, 327, 329, 330, 331, 333, 336, 337, 339, 340, 350, 356, 363, 366, 368, 423, 610, 629, 630.

Comparative Literature: Any two comparative literature courses at the 200 level or above; 400-level courses with permission of the instructor or the director of undergraduate studies.

European Languages: Any two courses in English at the 200 level or above, except English 496. If students have used English courses to satisfy the expressive arts requirement, they should not take courses numbered between the 200s (e.g., 281, 382) to satisfy the humanities requirement.

French Literature: Any two courses from 200, 201, 202, 222, or 300-level literature courses.

German Literature: Any two courses at the 200 level or above.

Italian Literature: Any two of 201–202 or any 300-level literature courses.

Near Eastern Studies: Any two NES civilization or literature courses at the 200 or 300 level that form a reasonable sequence or combination, including Hebrew 201–202. NES 197 plus an NES literature course will also satisfy the humanities requirement.

Philosophy: Any two courses with the following exceptions: (1) Philosophy 100, if used to satisfy the freshman writing seminar requirement; (2) a combination of two courses in logic, such as 131, 231, 431, 432, 433.

Russian Literature: Any two courses at the 200 level or above except 329, 330.

Spanish Literature: Two of 201, 315, 316, 317, or any one of the 3- or 4-credit literature courses.

Women's Studies: (a) Any two of 248, 251, 348, 349, 363, 365, 366, 390, 402, 404, 414, 445, 453, 456, 476; or (b) any one of 110, 365, 493, plus one course from list a. (Appropriate courses in women's studies taken previously may be approved by the program.)

b. Expressive Arts


Archaeology: Any two courses at the 200 level or above, or Archaeology 100 and one of the History of Art courses listed under Archaeology.

Music: 6 credits in music, except freshman writing seminars. A maximum of 3 credits in Music 331 and a maximum of 3 credits in Music 331 through 338 and 441 through 450 may be used to satisfy this requirement.

Theatre Art: Any of the 3- or 4-credit courses at the 200 level or above.

Group 4: Mathematics or an Unused Subdivision

a. Mathematics and Computer Science

Any 6 credits in mathematics, but not including more than one course from 105, 107, 403. Computer
Courses, Credit, and College Requirements

A course may not be used to fulfill more than one college requirement, with the following exceptions.

1) A course may be used to fulfill a distribution requirement, and also a major requirement, provided that the major adviser agrees.

2) A one-semester course in foreign literature that is acceptable for achieving proficiency in that language may also be used as a partial fulfillment of the distribution requirement in the humanities.

3) Students whose native language is not English who take English 211-212 may fulfill both the freshman writing seminar requirement and the appropriate distribution requirement by taking two freshman writing seminars offered in English, history, history of art, Classics, philosophy, Romance studies, Russian literature, German literature, or comparative literature.

4) Students who choose to double major may use the courses for one major as "related" hours in the other major if the subjects are indeed related and if the department approves.

Courses used to fulfill college requirements (but not major requirements) may be taken for S/U grades.

Repeating courses. Students may repeat courses. If the instructor certifies that the course content has been changed, credit may be granted a second time. If the content has not changed, both grades will appear on the transcript and will be included in any average that is calculated, but credit will be counted toward the degree only once. Students who plan to repeat a course should submit a petition to the Office of Records and Scheduling, 46 Goldwin Smith Hall.

Attendance. In classes is a matter between students and their instructors. If a student cannot attend classes because of illness or family crisis, the Academic Advising Center will notify instructors when requested to do so, but students must arrange for making up examinations or other work with their instructors. When students will be absent because of religious holidays, they must discuss arrangements for making up their work with their instructors. Students who must miss an examination should be sure to contact the professor. Alternative arrangements are at the discretion of the instructor.

Transferring credit. The college evaluates credit received from either another school or college at Cornell University or another accredited institution of collegiate rank to determine the number of courses the student may accept and the Bachelor of Arts degree. Tentative credit evaluations are normally provided to students in each freshman class from the usual college credit at another institution. Students must organize for making up examinations or other work with their instructors. When students will be absent because of religious holidays, they must discuss arrangements for making up their work with their instructors. Students who must miss an examination should be sure to contact the professor. Alternative arrangements are at the discretion of the instructor.

Advanced placement credit. Transcripts should be sent to the Office of Records and Scheduling, 46 Goldwin Smith Hall. Entering students who want to receive credit toward the degree for courses taken at Cornell or elsewhere should have transcripts sent to the Office of Records and Scheduling, 46 Goldwin Smith Hall, during the summer before matriculation. Summer courses at Cornell or elsewhere do not count toward the eight-semester residence requirement.

Noncredit courses. The college does not grant credit toward the degree for all courses offered by the university. Courses in remedial or developmental reading (for instance, Human Ecology 100) and mathematics, and supplemental science courses offered by the Learning Skills Center, carry credits that are counted toward good standing in a given semester but not toward graduation. Physical education, typing, shorthand, and most military training courses are among those for which credit is not given. Faculty legislation prevents granting credit toward the degree for service as an undergraduate teaching assistant.

Auditing. The college encourages its students to take advantage of its rich curriculum by sitting in on courses that interest them but cannot be fitted into their schedules for credit. As long as the instructor agrees, students are welcome to visit courses. Small seminars and language courses are sometimes not open to casual visitors.

Physical Education

See "University Requirements for Graduation," p. 10. The college does not count physical education credit toward the 120 credits required for graduation.

Special Academic Options

Degree Programs

The following programs allow students to work toward more than one degree or to fulfill the college's requirements or departmental requirements for the major.

Independent Major Program

The Independent Major Program allows students to design their own interdisciplinary majors if they want to pursue an academic interest not offered within an established major. Proposals for an independent major must be supported by a faculty adviser and are assessed by a board of faculty members. Board members consider whether the plan is equivalent in coherence, breadth, and depth to a departmental major, whether it is well suited to the student's academic preparation, and whether it provides a liberal education. Independent majors substitute for established majors, but students must still satisfy all the other requirements for the baccalaureate degree. Students should contact the director of the Independent Major Program, Academic Advising Center, 55 Goldwin Smith Hall, for further information. Deadlines for submitting independent major proposals are listed on the calendar supplement for the College of Arts and Sciences.

College Scholar Program

The College Scholar Program frees no more than forty students in each freshman class from the usual college requirements for a degree and allows them to design their own academic programs. It is meant to serve students whose interests and talents do not easily fit into the usual departmental majors, who demonstrate exceptional promise, and who show the maturity to plan and carry out, with the help of an adviser, a well-designed program of studies. College Scholars do not all design the same kind of program: some, for instance, pursue diverse interests, while others integrate a variety of courses with a common theme.

College Scholars must complete 120 credits of course work (100 in the college) and, unless they receive special permission from the program to accelerate, eight terms of undergraduate study. They must complete the physical education requirement. All College Scholars must complete a senior project. They are not required to complete or fulfill the distribution requirements, but members of the College Scholar Advisory Board believe that the spirit of the requirement is a good one.

Each applicant to the College Scholar Program is asked to write an essay, which is due in May of the freshman year. Students should contact the Academic Advising Center, 55 Goldwin Smith Hall, for further information.

Double Majors

A student may complete a double major by fulfilling the major requirements in any two departments of the college. No special permission or procedure is required. Students will want, however, to become accepted into both majors and be assigned an adviser in each department. Both majors will be posted in the official transcript.

Dual Degree Programs with Other Colleges

Especially ambitious and diligent students may earn both a Bachelor of Arts degree from the College of Arts and Sciences and (1) a Bachelor of Science degree from the College of Engineering or (2) a Bachelor of Fine Arts degree from the Department of Art in the College of Architecture, Art, and Planning or (3) a Bachelor of Science degree in urban and regional studies from the Departments of City and Regional Planning in the College of Architecture, Art, and Planning or (4) a Bachelor of Science degree in architectural history from the College of Architecture, Art, and Planning. The dual degree program ordinarily takes five years to complete. Students enter one of these colleges as freshmen and begin the dual degree program with the second college in the second or, in some cases, the third year. For further information, students should contact assistant dean Rosenberg, Academic Advising Center, 55 Goldwin Smith Hall.

Double Registration with Professional Schools

Double registration in the College of Arts and Sciences and with the Cornell Law School and Cornell Medical College is possible. A few exceptionally well prepared students who have earned 105 credits before the start of the senior year and have been accepted by one of the above-named professional schools may be permitted to register simultaneously in the college and in one or another of these professional schools during the seventh and eighth terms.

Students interested in the joint program with the Law School should see assistant dean Buettnel, Academic Advising Center, 55 Goldwin Smith Hall.

Students registering in the college and in the Cornell Medical College receive the Bachelor of Arts degree after their first year of medical studies and the Doctor of Medicine degree after the remaining three years of medical college are completed. Interested students should contact Jane Crawford, health careers coordinator, 203 Barnes Hall.

Double-registered students must, of course, complete all requirements for the B.A. degree, including 100 credits in College of Arts and Sciences courses.

Special-Interest Options

The following options do not alter the college's requirements but enable students to pursue special interests within the usual program. Independent course work is involved in independent study and in the Undergraduate Research Program, premedical and prelaw counseling helps students make appropriate use of the regular curriculum.
The college offers a concentration in law and society. Students should work towards completion of this concentration because they are interested, not because they believe it will convince law schools of their interest.

The adviser for students in the College of Arts and Sciences who are applying to law school is assistant dean Buettner, Academic Advising Center, 55 Goldwin Smith Hall.

**Preliminary Study**

The breadth and depth afforded by a liberal arts education are invaluable for people who plan medical careers, whether they intend to practice or go into medical research. Such training has a profound effect on the doctor's usefulness to patients, and it affords the flexibility of mind that is needed for major research undertakings. Medical and dental schools do not prescribe or even prefer a particular major; they do, however, require particular undergraduate courses. Students who are interested in medical careers are urged to visit the Health Careers Office, 203 Barnes Hall.

The adviser for students in the College of Arts and Sciences who are planning careers in medicine is assistant dean Buettner.

**Off-Campus Programs**

Many students find it important to their majors or to their overall academic programs to study abroad for one or two semesters. When it makes academic sense, the college encourages its students to pursue such studies and grants credit toward the degree for work satisfactorily completed.

**Study Abroad**

In 1986–87, 162 students in the college studied abroad. Cornell has established affiliations with several universities in Britain, Denmark, Egypt, and Israel, as well as its own programs in France, Germany, Italy, Spain, and Switzerland. Students have studied in those countries and in others all over the world. Before planning a program for study abroad, students should consult assistant dean Rosenberg, in the Academic Advising Center, 55 Goldwin Smith Hall, who will help them find the program most appropriate to their academic goals.

A request to study abroad must have the support of the faculty adviser, and courses must be approved by the directors of undergraduate studies in the departments teaching those subjects. A maximum of 30 credits for a year or 15 credits for a semester may be earned abroad. These credits may count as part of the 100 credits required within the College of Arts and Sciences. Normally, transfer students will not be allowed to study away from Cornell.

Students studying abroad must be in good academic standing the semester prior to departure. No more than two semesters abroad are allowed.

**Summer Residential Programs in Archaeology**

During the summer months students may participate in a Cornell-sponsored archaeological project. In recent years the program has organized archaeological projects in New York State, Central America, South America, and the Mediterranean region. Students should contact the Archaeology Program for information about the sites available this summer.

**Marine Science**

Shoals Marine Laboratory is a seasonal field station designed to introduce undergraduates to the marine sciences. The laboratory is located on Appledore Island, six miles off the Maine and New Hampshire coasts. Students should contact the Division of Biological Sciences for further information.

**Advising**

The following advisers and offices provide information on college procedures and regulations, academic advising, or counseling.

**Faculty Advisers**

Faculty advisers help students design programs of study and advise students about ways to achieve their academic goals. Faculty members volunteer to act as advisers to new students in the college; advisers and advisees meet during orientation week to plan the student's program. Students are encouraged to see their advisers again early in the term, before it is too late to drop courses and before signing into courses for the following term, to discuss their academic program and to become acquainted. Academic difficulties may frequently be solved or avoided if students and advisers recognize problems early.

Advisers must approve each semester's program and any course changes. Students who would like to petition for an exception to college rules should discuss the matter with their advisers; the adviser must review and sign the petition before it may be acted upon. No one else may sign for the faculty adviser.

Advisers may also help students with study or personal problems or direct them to other offices on campus where help is available.

**Student Advisers**

Each student is assigned a student adviser who can provide information about the college's requirements, courses, and instructors and about life at Cornell.

**Major Advisers**

After acceptance into a major program, students are assigned a major adviser, a faculty member in the major department, with whom they make most of their important decisions at Cornell. The adviser must approve the student's course of study and eventually certify the completion of the major.
Registration and Course Scheduling

Registration with the University

All students must register with the university at the beginning of each semester. Registration materials are available at a time and place announced each term by the Office of the University Registrar.

Enrollment in Courses in the College of Arts and Sciences

Students must enroll in courses through the Office of Records and Scheduling in the college, 46 Goldwin Smith Hall.

New Students

The Academic Advising Center conducts briefings during orientation week for incoming freshmen and transfer students about procedures for scheduling courses.

Continuing Students

Continuing students are expected to select and schedule courses in advance in the current term. Students who fail to sign into courses during the designated period must wait until the beginning of the semester and may have difficulty securing places in the courses they desire. Students may schedule up to 18 credits during the advance scheduling period. Information and materials will be available in the Records and Scheduling Office, 46 Goldwin Smith Hall. Before signing into courses, students should make appointments with their faculty advisers to plan their programs. Advance course scheduling is the best time to discuss long-range goals with faculty advisers. Student advisers will also assist students. All students are welcome to discuss programs and plans with an assistant dean in the Academic Advising Center, 55 Goldwin Smith Hall. The Records and Scheduling Office issues a supplement to Courses of Study showing last-minute changes in courses; the supplements of other divisions of the university are also available for reference in the Office of Records and Scheduling. Continuing students receive their course schedules at university registration. In the fall they also receive a copy of their Permanent Record Card, which shows the courses taken, grades received, graduation requirements fulfilled, and academic actions. Copies of Permanent Record Cards are not official transcripts, but they reflect the official record and should be corrected in the Records and Scheduling Office if they are incorrect.

Limits on Courses and Credits

Students must take four or five courses (15 credits) each semester in order to graduate in eight terms. At a minimum, students must carry three or four courses (12 credits). If compelling personal or academic reasons students need to carry fewer than 12 credits, they should consult the faculty adviser and the assistant dean of their class. Permission is by petition only. Completion of fewer than 12 credits without permission results in unsatisfactory academic standing. First-term freshmen may not register for more than 18 credits; other students may register for more than 18 credits only if their previous term's average was a B or higher and if their faculty advisers approve. No more than 22 credits may be taken in a regular semester without permission of the Committee on Academic Records.

Any student who is not officially enrolled in a schedule of courses by the end of the twelfth week of classes may be withdrawn from the college.

Forfeiy on Forms

Students must have course registration forms and all petitions signed by their faculty advisers to show that advising has taken place. Forgery signatures or credentials on college forms is an academic offense in that it interferes with advising; sometimes it constitutes academic fraud. In all cases of forgery on academic forms, the effect of the forged documents shall be negated. Students may then petition properly to do whatever they attempted to do improperly. Such incidents will be recorded in the Academic Integrity Hearing Board corer.ries. If a student forges more than once or if the forgery would advance the student's academic standing unfairly or fraudulently or if, for any other reason, the situation requires some other response, in addition to the Academic Integrity Hearing Board's recommendation, the Academic Integrity Hearing Board might make a different recommendation, such as a notation on the student's transcript, suspension, or dismissal.

Special Registration Options

Adding and Dropping Courses

After advance course enrollment, students may not add or drop courses until the new term begins. All program changes must be approved by the course instructor (or by the person designated by the appropriate department) and by the faculty adviser. During the first three weeks of the semester, course changes may be made without fees. Add/drop forms are available in the Records and Scheduling Office, 46 Goldwin Smith Hall. After the third week of classes courses may be added, and after the eighth week courses may be dropped, only by petition. Students who want to withdraw from a course after the eighth week of the term must meet with an assistant dean and submit a petition by the end of the twelfth week of the semester. Students may withdraw from courses between the ninth and twelfth week of the term if (1) the instructor certifies the student has worked hard to master the material and has completed assigned work and taken exams, (2) the instructor and the adviser approve, and (3) no issue of academic integrity is at stake. The records of students whose course loads drop below 12 credits will be reviewed at the end of the semester.

Courses dropped after the eighth week will be noted on the transcript by a "W" where the grade would normally appear. No petitions to withdraw from courses may be submitted after the end of the twelfth week in the term. Deadlines for short courses are adjusted according to the length of the courses. After the midpoint of a short course, students who wish to add or drop the course must petition to do so.

For each course change approved after the third week there is a $10 fee.

Leaves of Absence

Taking time off from college to think about goals and progress, to gain additional experiences or funds, or just to take a break from studying is sometimes useful to students. Those in good standing who take a leave by the end of the eighth week of the semester are welcome to register in the college the following semester. Five years is the maximum length of time a student may be on leave and return without special permission. Leaves of absence are of four types:

1) Personal leaves impose no conditions concerning the right to reenter the college except for the five-year limit. Readmission is automatic if a written request is made one month before the beginning of the term in which the student wishes to return.

2) Medical leaves are granted only on recommendation by a physician from Gannett Health Center. Such leaves are granted for an unspecified length of time (up to five years) with the understanding that the student may return at the beginning of any term after the medical condition in question has been corrected. In some cases, students must satisfy the Gannett Health Center that the condition has been corrected before they may return.

3) Conditional leaves may be granted if the student is not in good standing or, in unusual circumstances, an assistant dean and submit a petition by the end of the twelfth week in the term. Normally students may not return from conditional leaves for at least two terms or until specific and individual conditions, such as completing outstanding work, have been met.

4) Required leaves: The Academic Records Committee may require a leave of absence if a student is in academic difficulty. See the section Academic Actions.

Any student who wishes to take a leave of absence should consult an assistant dean in the Academic Advising Center. On readmission, the student's graduation date will be recalculated according to the number of terms completed, the number of acceptable credits earned toward the degree, and the credit requirements for graduation. Students who take courses elsewhere while on leave, may petition to have credits accepted as part of the 20 out-of-college credits of the 120 credits needed for graduation. Approval depends on the judgment of the relevant departments and acceptable grades.

Withdrawals

A withdrawal is a voluntary severance of connection with the university if a student wants to withdraw after registering for the term, the withdrawal must be requested before the end of the eighth week of classes. A notation of "W" will appear on the transcript for any course dropped after the eighth week. On withdrawal it is assumed that the student will not want to reregister in the college. Students who seek readmission after withdrawing from the college write an appeal to the Committee on Academic Records. If a student fails to register for a term and does not request a leave, the student will be withdrawn from the college for failure to register.

Transferring within Cornell (Internal Transfer)

Internal transfer from one college or school at Cornell into another is attractive for many students whose intellectual interests change. Students who want to transfer should discuss their eligibility with a counselor at the new school or college.

In some cases students who want to transfer into the College of Arts and Sciences may transfer directly. In other cases they may be referred to the Division of Unclassified Students. During the term immediately preceding transfer into the College of Arts and Sciences, a student should complete at least 12 credits of courses in the College of Arts and Sciences with superior grades and without any grades of Incomplete, any S-U grades (unless only S-U grades are offered for that particular course), or any grades below C. Satisfying this minimum requirement does not, however, guarantee admission. Admission to the college is based on consideration of the student's entire record at Cornell and the high school record, not just the work of one semester. Interested students should see assistant dean Unsworth, in the Academic Advising Center, 55 Goldwin Smith Hall.
Part-Time Study and Pro Rata Tuition
The college ordinarily expects its students to be full-time students. Except in the case of Ithaca residents who are twenty-three years of age or older, part-time attendance is permitted only in unusual circumstances.
In certain circumstances seniors who are completing their final term in the college may be allowed to register for fewer than 12 credits and pay pro rata tuition. The guidelines for granting this permission are adhered to strictly.
Guidelines for part-time study:
1) A student who has completed all degree requirements by the end of the seventh term, and could have received permission to accelerate, may request permission to study part-time during the eighth term.
2) A student who has completed all degree requirements in seven terms but is majoring in a department that requires candidates for honors to complete the thesis in the eighth term may be permitted to register for fewer than 12 credits.
3) A student who has received permission to accelerate, but who has been forced to drop a course (for reasons beyond his or her control) and has not been able to complete the course work on schedule, may be able to complete the requirements as a part-time student.
4) A student who is pursuing honors work and must complete extensive research away from the campus, which precludes registering for additional courses, may be allowed to register for fewer than 12 credits.

Academic Standing
Students are in good standing for the term if they successfully complete at least 12 credits by the end of the term and receive no more than one D and no F or U grades. If a student completes only three courses, all grades must be above D. In addition, students are expected to make satisfactory progress toward satisfying requirements for the degree. They are expected to earn grades of C (not C-) or better in at least 100 of the total credits for the degree.

Honors
Dean's List
The requirements for the Dean's List are based on the number of letter grades of A (i.e., A, A+, or A-) a student receives for grades. 5 grades and credits for grades are not considered. Students must have the following number of grades: A: 12 credits; all As; 13 or 14 credits, 10 A's, the rest B's. For 15 credits students must have 8 credits of A's, the remainder B's. In the 15-credit category, if any of the letter grades received are C or C+, there must be an equal number of A credits in addition to the 8 credits of A's. Grades of C or below are automatic disqualification from the Dean's List. Any failure or grade of U in a course that counts toward credit for graduation disqualifies students for the Dean's List.
1) Incomplete grades. Qualification for the Dean's List is determined by credits completed by the end of the term. If there is anIncomplete grade, the student will be considered for the Dean's List retroactively when the incomplete is made up.
2) Courses not considered toward the Dean's List are any courses that do not fulfill any of the college requirements for graduation (see the section on "Noncredit Courses" above). In addition, credits for courses graded S, courses with "W" (withdrawn after the eighth week of classes), courses taken for zero credits, supplemental courses (001, 003, etc.), and Mathematics 109 are not considered in the calculation of the Dean's List.
Two-term honors courses are not usually given a letter grade until work is completed. Consideration for the Dean's List is made when the grade is issued. This grade will be considered the appropriate grade for both semesters of the course. For example: an 8-credit two-term grade of A would be counted as 4 credits A for the first semester of the honors work and 4 credits A for the second semester. If the grade and hours are sufficient to qualify the student for the previous term, the student's name is then retroactively added to the Dean's List.

Bachelor of Arts with Honors
Almost all departments offer honors programs for students who have demonstrated exceptional ability in the discipline and who seek an opportunity to explore branches of their subject not represented in the regular curriculum or to gain experience in original research. The honors programs are described by individual departments in the following sections. The degree of Bachelor of Arts is conferred upon students who, in addition to having completed the requirements for the degree of Bachelor of Arts, have satisfactorily completed the honors program in their major and have been recommended for the degree by their major department, the Independent Major Program, or the College Scholar Program.

Bachelor of Arts with Distinction
The degree of Bachelor of Arts with distinction in all departments in the college, including the departments that require candidates for honors to take two-term honors courses, will be awarded to students who, in addition to having completed the requirements for the degree of Bachelor of Arts, have:
1) completed at least 60 credits while registered in regular sessions at Cornell;
2) ranked in the upper 30 percent of their class at the end of their seventh semester, or next-to-last semester for transfers and accelerants;
3) received a grade below C in no more than one course;
4) received no failing grade;
5) maintained good standing in each of their last four terms; and
6) have no Incompletes remaining on their records.

Failure to Maintain Good Standing
Students are not in good standing if they complete fewer than 12 credits; if they have more than one D, or one D in a schedule with only three courses, or any F or U grades; if they have not made satisfactory overall progress in grades or credits (whether due to failures or Incompletes) or in the requirements of the college or the major. Such students will be considered for academic action by the Committee on Academic Records or one of the deans of the college.

Academic Actions
Warning: Any student who fails to maintain good standing will at least be warned. The warning may be given by an assistant dean in the college or by the faculty's Committee on Academic Records. A warning is posted on a student's Permanent Record Card but is not reported to the university registrar and does not appear on official transcripts.
Required leave of absence: A student in serious academic difficulties may be required by the Committee on Academic Records to take a leave of absence, normally for a full year. Usually, but not necessarily, the Committee on Academic Records warns a student before suspending her or him. Before being allowed to return and reregister in the college, students must submit a plan for completing the degree. In some cases the students will be required to furnish evidence that they are ready to return before being allowed to reregister in the college. Students who request to return in less than a year must present to the committee exceptionally strong evidence of their readiness to return. "Required Leave of Absence" is posted on the student's Permanent Record Card in the college; the university registrar is notified and "Leave of Absence" and the date will appear on the student's transcript.

May not reregister. The Committee on Academic Records may dismiss a student from the college because of a highly unsatisfactory record for one term or for failure to make satisfactory overall progress in grades, credits, or the requirements of the major. This action expels the student permanently from the college. "May Not Reregister" is posted on the student's Permanent Record Card; the university registrar is notified; and "May Not Reregister in the College of Arts and Sciences" and the date will appear on the official transcript.

Students being reviewed for academic action are urged to present evidence that will help explain their poor academic performance and appeal a decision of the committee if they have new evidence to present.

Grades
Letter Grades

S-U Grades
The S-U option allows students to explore unfamiliar subject areas without being under pressure to receive high grades. It is not meant to reduce the amount of work a student completes in a course or the amount of effort a student devotes to a course. Students may elect during the first three weeks of the term to receive a grade of S (satisfactory) or U (unsatisfactory) instead of one of the letter grades (A+ through F). Provided that the instructor is willing to assign such grades. A grade of S is equivalent to a grade of C- or higher; a grade of U is equivalent to any grade below C-. S means the student receives the credit specified for the course. U means no credit is given. A few courses in the college are graded exclusively S-U. Courses that will count toward satisfaction of major requirements should not be taken for an S or U grade unless the department grants permission. Students may elect the S-U option in courses used to satisfy the distribution and language requirements, provided that such courses do not also count toward major requirements or serve as prerequisites for admission to the major. Students are advised to use the S-U option sparingly if they intend to apply to graduate school or for transfer to another college. There is no limit on the number of courses each term for which students may elect the S-U grade, but within the 120 credits required for the degree, a minimum of 80 credits must be in courses for which a letter grade was received.

To elect the S-U option, students fill in the proper space on the optical scan forms during course enrollment. To change grading option during the first three weeks of the term, students obtain a course change form from the Office of Records and Scheduling, 46 Goldwin Smith Hall; fill the form out to indicate the grade option change and have it signed by the course instructor and their faculty adviser. The form must be returned to the Office of Records and Scheduling. Students may not elect the S-U option after the third week of the term. With special permission they may change from S-U to a letter grade within the first five weeks of term, although a $10 fee is charged after the third week. Any senior planning to take a course for an S-U grade in the last semester should consult with assistant dean Beutner.
Incomplete Grades

A grade of Incomplete signifies that a course was not completed before the end of the term for reasons beyond the student's control that are acceptable to the instructor. Students must have substantial equity in the course; that is, they must be able to complete the remaining work without further registration and must have a passing grade for the completed portion. When a grade of Incomplete is reported, the instructor will state what work must be completed, when it must be completed, and the grade earned even if the work is not completed by that date. Unless the instructor stipulates otherwise, students will be allowed one term plus one summer to make up the work. When a final grade is reported, it is recorded on the official transcript with an asterisk and a footnote explaining that this grade was formerly an Incomplete.

Once an Incomplete is assigned, the college does not change it unless and until the faculty member submits a change of grade form or gives written permission to "freeze" it as an Incomplete. The college does not automatically change Incompletes to Fs after a certain lapse of time or implement the conditions on the Incomplete form. Students must consult the instructors to resolve Incompletes. All Incompletes must be resolved before graduation.

R Grades

R designates two-semester or yearlong courses. The R is recorded on the student's Permanent Record Card at the end of the first term. The grade recorded at the end of the second term shows the student's level of performance in the course for the entire year. The total credits that will be earned for the whole course are listed each term.

Grade Reports

Grade reports for the fall term are included in spring-term registration materials; grade reports for the spring term are mailed to students at their home addresses unless alternative addresses are reported to the college or university registrar by mid-May. The college does not compute class rank.

Calendar Supplement

All of the dates in the university calendar at the front of this volume apply to all Cornell students. Listed below are some additional dates that are of importance for students in the College of Arts and Sciences.

| Deadline for applying to study abroad. | See Dean Rosenberg, Academic Advising Center |
| Advance course enrollment for the following term (tentative). | Oct. 27 – Nov. 6 April 6 – 17 |
| Last day to petition to drop a course | Nov. 20 Apr. 22 |
| Deadline for applying to the College Scholar Program. | Last day of study week, May 11 |
| Deadline for requesting internal transfer to the College of Arts and Sciences for the following term. | Dec. 1 June 1 |

Courses and Departments

Special Programs and Areas of Concentration

The college offers a number of special and interdisciplinary programs that are described following the departmental program descriptions. Students may devise an independent major with the aid of any of these programs or develop an informal minor field. Informal minors are not listed on the student's official record.

General Education Courses

See also "Common Learning Courses," pp. 6–7. The introductory and advanced courses offered by departments in their respective disciplines and fields comprise the bulk of the curriculum in the College of Arts and Sciences. Most of these courses are accessible to almost all students who are interested in them. However, the faculty of the college also offers general education courses, including interdisciplinary courses for a broad audience, courses that provide insight into a particular discipline for students who are not specializing in that field, and courses for advanced students that consider a discipline in terms of its history, its presuppositions, or its relation to other branches of knowledge. The following courses have been identified by the various departments of the College of Arts and Sciences as particularly appropriate, by that definition, for general education. For full course descriptions consult the departments' sections of the catalog.

American Studies

Some professors in English and history with an interest in American studies regularly teach courses that emphasize the interconnections of literary and historical materials. Some courses, such as History 275, focus on these interconnections with a non-specialist audience in mind; others, such as English 464, aim at an upper-level audience to put literature and history in a comparative perspective with respect to a common subject. These purposes may suit not only American studies, English, or history majors, but the general education interests of nonmajors. Members of the American Studies Committee can be consulted about the pertinence of their courses to general education.

Archaeology

Several members of the Archaeology Program offer general education courses suitable for nonmajors. These are listed under the departments that offer archaeology courses, such as the Departments of Anthropology, Classics, History of Art, and Near Eastern Studies. The Archaeology Program itself also offers:

203 Early People: The Archaeological and Fossil Record (also Anthropology 203) Fall. 3 credits. Not offered 1987–88

Asian Studies

211 Introduction to Japan Fall. 3 credits.
M W 11:15 plus disc; R 2:30 or 3:35, or F 10:10 or 11:15, K. Brazell.

212 Introduction to China Spring. 3 credits.
(4 credits with a special project, consult instructor for information).
T R 1:25 plus disc; R 2:30 or F 10:10 or 11:15.
E. Gunn and staff.
102 Introduction to Historical Geology  Spring. 3 credits. Prerequisite: Geol 101 or permission of instructor.  2 lecs, 1 lab, evening exams. J. L. Cisne.

German Literature


348 Women in Medieval Literature (also Comparative Literature 349 and Women's Studies)  Spring. 4 credits. MWF 9:05. B. Buettner.

396 German Film (also Comparative Literature 396)  Fall. 4 credits. T R 11:40-12:55. Screening T 4:30. D. Bathrick.

419 Thomas and Heinrich Mann (in English Translation)  Fall. 4 credits. MWF 12:20. P. U. Hohendahl.


678 Theory and Practice of Modern Drama (also Theatre Arts 678)  Spring. 4 credits. W 3:35. D. Bathrick.

History of Art

All 200-level courses and some 300-level courses. See department listing.

Psychology

326 Evolution of Behavior  Fall. 4 credits. T R 2:30-4:25. R. Johnston.


Russian Literature

367 The Russian Novel  Fall. 4 credits. T R 9:05 plus one hour to be arranged. G. Gibian.


388 Ideas and Form in Novels of Social Inquiry  Spring. 4 credits. MWF 9:05. G. Gibian.


American Studies


The Major

The major in American studies, appropriate for a wide variety of future vocations, is basically a program of coordinated study in the history and literature of the United States. It is not a "double major." The prerequisites are minimal: one course in European, British, or American history at the 100 or 200 level and one course in British or American literature at the 200 level. The major itself is structured and demanding, and students who expect to become American studies majors should apply to the chairman to arrange for a major adviser.

In consultation with their advisers, American studies majors elect 32 credits (or eight courses) of work in the history and literature of all three large periods into which an account of the nation's development can be divided, defined for the purposes of the program as colonial, nineteenth century, and twentieth century. In order to gain both depth and breadth, they select as an area of concentration either a single period (or the connections between two of the periods) and take either 16 credits in one period and 8 credits in each of the other two, or 12 credits in each of the two periods whose connections constitute the focus of the study and 8 credits in the third. In addition, they take one of the adviser-approved interdisciplinary seminars at the 400 or 600 level. When the subject matter is appropriate, such a seminar may count toward the satisfaction of the period requirements. Students may divide the work between history and literature in whatever proportion serves their interests, provided that they take no more than two-thirds of their courses in any one department.

Beyond the basic requirements in American history and American literature, 12 credits above the elementary level are required in Allied subjects. Eight credits of work are in the history or literature, or both, of another related culture; and 4 credits are in American thought, society, or culture studies from the perspective of another discipline such as anthropology, economics, government, history of art, and sociology. (This last 4-credit requirement may be satisfied outside the college.)

Courses in American history that will satisfy the 32-credit requirement described in the second paragraph are offered by the Department of History; those in American literature are offered by the Department of English, the Department of Theatre Arts, and the Africana Studies and Research Center. Occasionally a course that fits an individual student's program may be offered elsewhere. Substitution will depend on the adviser's approval. Advisers determine what courses count for the interdisciplinary seminar.

Honor. Candidates for honors must maintain an average of B+ in courses pertinent to the major. To be eligible for a degree with honors in American studies, a student must in the senior year (a) either write an honors essay for American Studies 493, Honors Essay Tutorial, or (b) submit to the American Studies Committee three term papers written for courses in the major and take an oral examination in the declared area of special interest.

Anthropology


Anthropology grew out of curiosity about the ways past and present human societies have differed and have been similar. As a craft, anthropology has developed and borrowed many strategies to approach these differences and uniformities. Some are archaeological, concerned with cultures long gone or destroyed by the spread of empires. Others are sociocultural, dealing with recent and contemporary rural and urban societies in all areas of the world through a variety of social and scientific and humanistic techniques. Still others are biological and evolutionary, stressing human evolution and biological uniformity and diversity. In-depth field studies, excavations, laboratory analysis, the
interpretation of symbol systems, and varieties of comparative methodologies are all part of anthropology.

Anthropology takes humanity in the broadest sense as its subject matter. Two 100-level courses (Anthropology 101 – 102) are intended to provide a general introduction to the anthropological enterprise in its varied dimensions. Several 200-level courses (203, 212, 214, 216) explore major strategies for doing anthropology, lessons learned so far, and questions remaining to be explored. Nature and Culture (211) focuses on fundamental questions about the relationships between the biological and cultural facets of human nature. The other departmental courses deepen and broaden the perspectives anthropology has brought to bear on the study of human nature. Biological and ecological anthropology is intrinsically interdisciplinary, all courses numbered below the 500 level are open to all students unless otherwise stated in the course description.

The Major

The student who majors in anthropology must:

1. Take two courses at the 100 or 200 level that provide a broad overview of the discipline as a whole and its major subdisciplines: anthropological archaeology, biological and ecological anthropology, and sociocultural anthropology. Courses that provide such an overview include Anthropology 101, 102, 203, 211, 212, 214, and 216. Preferably these courses will be taken in the freshman and sophomore years. (Freshman writing seminars in anthropology do not fulfill this requirement.)

2. Take Anthropology 300. The Discipline of Anthropology, no later than the fall term of the junior year. Because 211 provides a synthesis of the relationships between the biological and cultural dimensions of human nature, it is also recommended for majors.

3. Take at least one course in each of four of the following five categories:
   - category III: Archaeological Courses
   - category IV: Biological and Ecological Anthropology
   - category V: Sociocultural Anthropology
   - category VI: Theory and History of Anthropology
   - category VII: a course that focuses on some world area

4. Develop one or more areas of specialization within the discipline in consultation with his or her faculty adviser. Examples of such specializations include sociocultural archaeology, biological and ecological anthropology, and sociocultural archaeology. Students interested in any of these specializations must consult with the undergraduate studies faculty in the department, who will refer them to an appropriate academic adviser. When appropriate, special provisions for meeting major requirements may be arranged with the adviser's approval.

5. Take a total of 32 credits of course work, in addition to Anthropology 300, beyond the introductory level. Up to 12 credits of course work in cognate disciplines (see category VIII) related to the student's specialization may be accepted for the major with the permission of the faculty adviser.

Honors. Anthropology majors interested in the honors program should consult the director of undergraduate studies before the beginning of their senior year and apply for admission to the program. Candidates for the degree of Bachelor of Arts with honors in anthropology must complete a thesis in the final term of the senior year. Students may enroll in Anthropology 491 or 492, Honors Thesis, after obtaining the consent of the Honors Committee. The decision in awarding honors and in what degree is based on the quality of the thesis and the student's overall record.

Facilities

The anthropology laboratory contains a small statistical resources library, as well as basic drafting and photographic equipment. In addition, the department has a collection of archaeological and ethnological materials used in teaching and research.

Special Programs

Specialized individual study programs are offered in Anthropology 497–498. Topics in Anthropology, open to a limited number of juniors and seniors who have obtained consent of the instructor. Undergraduates should also note that most 600-level courses are open to them if consent of the instructor is obtained.

The Department of Anthropology holds colloquia throughout the academic year. Faculty members from Cornell and other universities participate in discussions of current research and problems in anthropology. Students are encouraged to attend.

Anthropology majors have also established an anthropology club, which sponsors educational and social events in conjunction with graduate students and alumni in the department.

I. Introductory Courses (Including Freshman Writing Seminars)

Note: For additional freshman writing seminars in anthropology see "Freshman Writing Seminars" and the John S. Knight Writing Program's special brochure.

101 Introduction to Anthropology: Biological and Prehistoric Perspectives on the Development of Humankind

Fall. 3 credits (4 by arrangement with instructor).

M W 12:20 plus disc; F 9:05, 11:15, 12:20, 2:15, or 2:30. M. LaVelle.

The biocultural development of humans and the broad implications of human biological and cultural diversity are explored through consideration of human evolution from the remote past to the present. Biological anthropology, archaeology, human ecology, and nutrition provide the conceptual bases for understanding the processes of biological adaptation in humankind.

102 Introduction to Anthropology: Social-Cultural Perspectives on Humankind

Spring. 3 credits (4 by arrangement with instructor).


An introduction to cultural anthropology through ethnographies, or the descriptive accounts of anthropologists. Through readings and lectures students acquaint themselves with a number of cultures from several parts of the world. The cultures range in form from those of small-scale tribal societies to those of state societies. Throughout the course we attempt to make sense of exotic cultures in their own terms. Attention is focused on variation in cultural patterns as they are expressed in social, economic, and ritual practices. In this encounter the principles of anthropology, as a comparative enterprise that poses distinct cultural systems in relief, will be developed. Fiction, films, and exercises supplement the formal anthropological materials.

121 Encounters with Other Cultures

Spring. 3 credits. Freshman writing seminar.

M W F 1:25. B. Lambert.

A survey of writing by anthropologists and other travelers who have told of their experiences as participants in other societies and as interpreters of other cultures. Students discuss and write about ways of playing the outsider's role and changes in the traveler's own outlook. Some of the lectures deal with the cultural contexts of the readings and thereby provide an introduction to the materials of cultural anthropology.

[127 Anthropology of the Arts Fall. 3 credits. Freshman writing seminar. Not offered 1987–88.]

205 Ethnographic Films Fall or spring. 2 credits.

W 7:30–9:25 p.m. B. J. Isbell.

Human cultural and social variability is explored through a series of ethnographic films, and readings and lectures relating to these films. The films are chosen to show peoples living in a variety of ecological situations and at different levels of social complexity in various parts of the world (i.e., Africa, Asia, Australia, the Americas). Readings and lectures will use the concepts and theories of cultural anthropology to interpret the significance of the different modes of life shown in the films.

211 Nature and Culture

Fall. 3 credits (4 by arrangement with instructor).

M W F 9:05. P. S. Sangren.

Cultural anthropology, because it encompasses the comparative study of man in society, provides a unique vantage on the nature of man. One of the focal questions of the discipline is the relationship between the physical/biological and symbolic/moral worlds in which we live. This inquiry places anthropology squarely at the center of social theory, since all social theories and political ideologies are founded on premises regarding human nature. Through study of a variety of issues, debates, and examples (e.g., "sociobiology," the origin and meaning of the incest taboo), this course examines a variety of past and current attempts to explain the relationships between nature and culture in human life.

[212 Social Anthropology Fall. 3 credits (4 by arrangement with instructor). Not offered 1987–88.]

[214 Humankind: The Biological Background Spring. 3 credits (4 by arrangement with instructor). Not offered 1987–88.]

[216 Ancient Societies Fall. 3 credits (4 by arrangement with instructor). Not offered 1987–88.]

II. Courses Intended Primarily for Majors

300 The Discipline of Anthropology

Fall. 4 credits. Limited to, and required of, anthropology majors, who must take this course no later than the fall term of the junior year.

T R 1:25–2:40. A. T. Kirsch with the anthropology faculty.

The course is an overview of the field of anthropology; it provides a systematic treatment of the discipline, the concepts that are used, the persistent questions that are asked, the specializations within the field, and the shared goals and differing viewpoints. The course is intended to help majors plan their course work.

491 Honors Thesis

Fall. 4 credits. Prerequisite: consent of the Honors Committee. Intended for majors graduating in midyear.

Hours to be arranged. Staff.

Independent work under the close guidance of a faculty member selected by the student.

492 Honors Thesis

Spring. 4 credits. Prerequisite: consent of the Honors Committee.

Hours to be arranged. Staff.

Independent work under the close guidance of a faculty member selected by the student.

495 Social Relations Seminar (also Sociology 497)

Spring. 4 credits. Limited to seniors majoring in social relations.

Hours to be arranged. Staff.

497–498 Topics in Anthropology

497, fall; 498, spring. Credit to be arranged.

Hours to be arranged. Staff.

Independent reading course in topics not covered in regularly scheduled courses. Students select a topic in consultation with the faculty member who has agreed to supervise the course work.

III. Archaeological Courses

See also courses listed under Archaeology.
203 Early People: The Archaeological and Fossil Record (also Archaeology 203) Spring. 3 credits. T R 11:40-12:55. Staff. A survey of the archaeological and fossil record of human evolution. Contributions by researchers from a variety of scientific disciplines are highlighted, as are the discoveries, personalities, and controversies that have enlivened the study of human evolution for more than a century. Critical evaluation of evidence and interpretations will be stressed. Demonstrations and films supplement the lectures.

352 Interpretation of the Archaeological Record Fall. 4 credits. Not offered 1987–88."

354 The Peopling of America Fall. 4 credits. T R 8:40–9:55. T. F. Lynch. Prehistoric discovery of the New World, beginning with American Indian origins in Asia and ending with the largely unrecorded European medieval contact with North America. Major topics include crossing the Bering land bridge, big-game hunting and extinctions, postglacial adaptations to changing environments, diversified subsistence in the eastern woodlands, agricultural civilizations of the Midwest and Southwest, and Eskimo and Norse exploration and settlement across the Arctic and North Atlantic.

355 Archaeology of Mexico and Central America Spring. 4 credits. Not offered 1987–88."

356 The Archaeology of South America Spring. 4 credits. T R 8:40–9:55. T. F. Lynch. Origins and development of South American agriculture and civilization, with special attention to Peru, the Andean heartland, and diffusion into the lowland forests and Caribbean. Major topics include domestication of plants and animals, the rise of temple-based cults and great art styles, formation of militaristic stages, regional interaction and the Inca empire, and the possibility of transoceanic influences.


361 Field Archaeology in South America (also Archaeology 361) Spring. 10 credits. Not offered 1987–88.


IV. Biological and Ecological Anthropology

285 Monkeys, Apes, and People: The Comparative Biobehavior of Primates Spring. 3 credits (4 by arrangement with instructor). T R 10–11 25. M. LaVelle. Humans are primates. Viewed from an ethological and ethnoecological perspective, humans share significant genetic, ecological, and behavioral similarities with monkeys and the great apes. This course provides an overview of primate biology and behavior as well as exploration of such issues as the origins of human language and culture, human family structure, and gender roles.


386 Culture and Human Disease (also Biology and Society 386) Fall. 4 credits. M W F 10:10. M. LaVelle. This course explores the interrelationships between human society and the incidence of biological illness. It focuses upon genetic and behavioral mediation of the immune system, as well as the culturally shaped epidemiology of parasitism, zoonoses, chronic disease, addiction, and diseases of undernutrition and overnutrition and aging. The format of the course is lecture-discussion with guest lectures from researchers with expertise in specific disease problems.

476 Human Nature: An Evolutionary Perspective Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.

V. Sociocultural Anthropology


242 American Indian Philosophies I: Power and Worldviews (also Rural Sociology 242) Fall. 3 credits. Limited to 20 students. Not offered 1987–88.

243 American Indian Philosophies II: Native Voices (also Rural Sociology 243) Spring. 3 credits. Limited to 20 students. Not offered 1987–88.

301 Biology and Society: The Biocultural Perspective (also Biological Sciences 301 and Biology and Society 301) Fall. 3 credits (4 by arrangement with instructor). Biology and society majors are required to take the course for four credits. Prerequisite: one year of introductory biology. S-U grades optional. This is the core course requirement for the biology and society major and is also open to other students who have fulfilled the prerequisite.

305 Emotion, Cognition, and Culture (also Women's Studies 305) Fall. 4 credits. M W F 1:25. B. J. Isbell.

323 Kinship and Social Organization Spring. 4 credits. M W F 11:15. B. Lambert. Much of this course is a survey of forms of the family, descent groups, and marriage systems. The role of age and sex in the social structure is also considered. The last part of the course is devoted to a history of the British and American family and to its fate in utopian communities.

325 Histories of Ideas of Exotica (also Comparative Literature 325) Fall. 4 credits. T 2:30–4:30. J. A. Boon. A survey of texts and contexts in European explanations of tribal, Indic, and other non-Western populations. We explore topics across ancient, medieval, Renaissance, Enlightenment, and Romantic-comparativist anthropologies, including monstrosities, paradise, degradation, kingship, utopias, hermetics, nature, sexuality, marriage, language, economy, descent, and authority.


367 American Indian Tribal Governments (also Rural Sociology 367) Fall. 4 credits. Not offered 1987–88.

406 The Culture of Lives (also Women's Studies 406) Spring. 4 credits. Prerequisite: Anthropology/Women's Studies 321 or permission of instructor. Not offered 1987–88.

422 Special Problems in the Anthropology of Sex and Gender (also Women's Studies 422 and Biology and Society 405) Fall. 4 credits. Not offered 1987–88.


428 Spirit Possession, Shamanism, Curing, and Witchcraft (also Women's Studies 428) Spring. 4 credits. Prerequisite: background in anthropology or women's studies. Enrollment limited. T 8:40–10:40. D. H. Holmberg.

442 American Indian Philosophies: Selected Topics (also Rural Sociology 442) Spring. 4 credits. Not offered 1987–88.


VI. Theory and History of Anthropology

[306 Ethnographic Description Spring. 4 credits. Not offered 1987—88.]

[408 Gender Symbolism (also Women's Studies 408) Spring. 4 credits. Not offered 1987—88.]

412 Contemporary Anthropological Theory Fall. 4 credits.
M W F 11:15. B. Lambert.
A survey of the assumptions anthropologists make concerning the nature of society and culture, and the explanations they have proposed for social behavior, values, belief systems, and ritual. Problems of order in society will be approached through processual analysis and the concept of transformation; problems of understanding other cultures, through interpretative and structural studies of cultural logic and symbolism. Examples will be drawn from Western and non-Western societies, past and present.

[414 Anthropology and History Spring. 4 credits. Not offered 1987—88.]

[417 Structuralism: For and Against Spring. 4 credits. Not offered 1987—88.]

420 Development of Anthropological Thought Spring. 4 credits.
Developing a paradigmatic perspective, this course attempts to locate the emergence and development of anthropological thought, theories, methods, and generalizations in the context of the Western social and cultural milieu. The particular emphasis will be on the changing shape of the academic discipline of anthropology.

426 Ideology and Social Reproduction Spring. 4 credits.
R 2:30—4:30. P. S. Sangren.
What is the logic of the process that links culture and social institutions? Why do all cultural systems (including "science") embody an element of logical circularity or definitional circularity? How do theories of society, economy, and nature relate to values, authority, power and legitimacy? Anthropology's comparative perspective on these questions is the focus of this course. Students will read and evaluate analyses of both familiar and exotic societies that focus on the dialectical relationship between ideas and institutions. The course will maintain a critical perspective toward contending theoretical positions (e.g., structuralist, Marxist, deconstructive), and encourage attention to the ideological dimensions of critical theory itself.

VII. Area Courses

230 Cultures of Native North America Fall. 4 credits.
M W F 2:30. B. Lambert.
A survey of the principal Eskimo and American Indian cultures north of Mexico. Selected cultures will be examined to bring out distinctive features of the economy, social organization, religion, and worldview. Although the course concentrates on traditional cultures, some lectures and readings deal with changes in native ways of life that have occurred during the period of European-Indian contact.

[318 Ethnohistory of the Iroquois (also Agriculture and Life Sciences 318) Spring. 3 credits. (4 by arrangement with instructor). Not offered 1987—88.]

331 The United States Spring. 4 credits.
How do Americans define their own culture, and how do they learn how to "be" American? This course examines central images of American identity—freedom, equality, and individualism—and explores their relationship to major social institutions: the family, the marketplace, social control, the political process, and religion. Readings combine contemporary American ethnography, popular social commentary, accounts by foreign travelers, and comparative perspectives from sociocultural anthropology. Field assignments, films, and discussion supplement the readings.

[333 Ethnology of the Andean Region Spring. 4 credits. Not offered 1987—88.]

[334 Ethnology of Island Southeast Asia Fall. 4 credits. Not offered 1987—88.]

[335 Peoples and Cultures of Mainland Southeast Asia Fall. 4 credits. Not offered 1987—88.]

[336 Ethnology of Oceania Fall. 4 credits. Not offered 1987—88.]

[342 Culture and Societies of India, Nepal, and Sri Lanka Fall. 4 credits. Not offered 1987—88.]

343 Religion, Family, and Community in China Spring. 4 credits.
The course provides anthropological perspectives on family and kinship, religion and values, economy and policy, and social organization in China. Both traditional society and culture and transformations in the People's Republic of China are considered. A major goal of the course is to provide a deeper understanding of the social and cultural fabric of the world's largest and longest-lived civilization.

345 Japanese Society Fall. 4 credits.
A survey of the social structure of Japan and a discussion of trends in urban and rural life during the past century. Topics to be emphasized include the family, ancestor worship, community and social organization, and urbanism and modernization.

393 Tradition and Change in Modern India (also Asian Studies 493) Fall. 4 credits.
Hours to be arranged. A. Gold.
We will examine selected aspects of twentieth-century Indian society and culture with a focus on understanding historical continuities and the processual transformation of tradition. Topics to be explored include concepts of hierarchy, gender, life cycles, and life stages in modern settings; urban Hinduism (temple worship, sect affiliation, healing, astrology, pilgrimage); and values of self-discipline, nonviolence, and social responsibility with particular reference to Gandhi. We read not only scholarly analyses of changing traditions but literary reflections of and on them. Requirements: active participation in discussions of readings, a research paper, and an oral presentation.

394 Ethnography of Malgudi: Fieldwork in the Fiction of R. K. Narayan (also Asian Studies 494) Spring. 4 credits.
Hours to be arranged. A. Gold.
The anthropology of fiction can develop both cultural and literary sensitivities. For India a rich fictional field exists in the works of R. K. Narayan, who has created in the town of Malgudi a diverse social universe consisting of many of the ironies and delights of modern life within an ancient civilization. The novels and short stories of Narayan form the bulk of our reading and the primary sources for our cultural analyses. Selected essays, texts, and films provide some supplementary background materials focusing on particular dimensions of life in Malgudi (and India), including families, sex roles, astrology, cosmology, myth, and ritual. Requirements: two-to-five-seven-page papers on focused topics distilled from the readings, a class presentation based on one of these papers, and consistently active participation in discussions.

[410 Balinese Culture: Description and Comparison Spring. 4 credits. Not offered 1987—88.]

[433 Andean Thought and Culture Spring. 4 credits. Not offered 1987—88.]

[456 Mosuo-American Thought Fall. 4 credits. Not offered 1987—88.]

VIII. Related Courses in Other Departments

Introduction to Archaeology (Archaeology 100)
Approaches to Archaeology (Archaeology 302)
Stone Age Archaeology (Archaeology 317)
Human Biology and Evolution (Biological Sciences 275)
Human Paleontology (Biological Sciences 371)
Contemporary European Society and Politics (History 283)
Cross-Cultural Psychology (Psychology 384 and Sociology 384)
Theories of Personality (Psychology 385 and Sociology 385)

IX. Graduate Seminars

600-level courses are open to undergraduates who have fulfilled the prerequisites or by consent of the instructor.

Southeast Asia Seminar: Indonesia (Asian Studies 601)
Southeast Asia Seminar: The Philippines (Asian Studies 602)
Contemporary Sociological Theories of Development (Rural Sociology 606)
607—608 Special Problems in Anthropology 607, Fall. 608, Spring. Credit to be arranged.
Hours to be arranged. Staff.

[610 Myth and Mythology Spring. 4 credits. Not offered 1987—88.]

611 Hierarchies, Ritual, and History Spring. 4 credits.
T R 2:30—4:25. J. A. Boon.
This course organizes readings in social theory around issues of hierarchy and modes of differentiating rank. Our guiding scholars include Durkheim, Weber, Bateson, Hocart, Dumont, Sahlin, Geertz, and others. Case studies come from Indonesia, Oceania, and India, and from Hinduism, Buddhism, and Islam. We try to distinguish the functionalist, structuralist, and varieties of dialectic approach. Several weeks are reserved for reading recent studies of most interest to students.

[612 History of Anthropological Thought Spring. 4 credits. Not offered 1987—88.]
Methods of Assessing Physical Growth in Children (Nutritional Sciences 612)

[614 Reading Ethnography Spring. 4 credits. Not offered 1987—88.]
108 Arts and Sciences

619 Anthropological Approaches to the Study of Buddhism in Asia Fall. 4 credits. W 1:30-2:30. A. T. Kirsch. This seminar will examine the various conceptual and analytical strategies employed by social scientists in the study of Buddhism, especially in South and Southeast Asia. Problems of religious complexity, the social correlates of Buddhism, and the role of Buddhism in social change will be explored.

623 Himalayan Issues, Problems, and Prospects Spring. Credit to be arranged. W 4:30–6:25. K. S. March. An advanced seminar for students committed to research and work in the Himalayas. The seminar is broadly interdisciplinary and strives for a balance between technical and theoretical issues. Specific topics depend on participant expertise and interest but may include Himalayan history, local political and economic change, and the problems of prospects for development.

626 Problems in Economic Anthropology Fall. 4 credits. Hours to be arranged. P. S. Sangren. This course is designed to consider in detail problems of theory and method in economic anthropology. Among the topics discussed are theories of value and exchange, articulation of modes of production, and regional analysis. Particular attention is paid to developing productive linkages between general theories of economy and society and participants' specific research interests.


Anthropometric Assessment (Nutritional Sciences 630)


633 Andean Research Fall or spring. 4 credits. Not offered 1987–88.

634–635 Southeast Asia: Readings in Special Problems 634, fall; 635, spring. Credit to be arranged. Hours to be arranged. Staff.

636 Cognition and Classification Fall. 4 credits. W 3:30–5:30. B. J. Isbell.

640–641 South Asia: Readings in Special Problems 640, fall; 641, spring. Credits to be arranged. Hours to be arranged. D. H. Holmberg, K. S. March. Selected readings in society, religion, and culture in South Asia.

645 Japanese Ethnology Fall. 4 credits. Hours to be arranged. R. J. Smith. This seminar is designed for advanced students who plan to conduct social science research in Japan. It deals with questions of social continuity, the relationship of the individual to society, and the nature of contemporary Japanese social organizations. A reading knowledge of Japanese is strongly recommended.

651 Anthropological Boundaries: Seminar on Film Spring. 4 credits. Open to undergraduates and graduate students with permission of instructor. Prerequisite: some knowledge of documentary or ethnographic film. Not offered 1987–88.

653 Myth onto Film (also Theatre Arts 653) Fall or spring. 4 credits. Open to undergraduates and graduate students with permission of the instructor. Prerequisite: some knowledge of any of the following: anthropology film, graphics, drawing, and painting. Not offered 1987–88.

656 Maya History Fall. 4 credits. Not offered 1987–88.

663 Hunters, Gatherers, and the Origins of American Agriculture Fall. 4 credits. Prerequisites: Anthropology 356 or permission of instructor. Open to qualified undergraduates. W 12:20–2:15. T. F. Lynch. The transition from hunting and gathering to agricultural subsistence, with particular attention to demographic, ecological, and coevolutionary factors. Topics to be emphasized are the history of thought on agricultural origins, archaeological evidence bearing on these theories, contrasts and conflicts between Western and non-Western systems, and the effects of agricultural instability and environmental degradation, particularly in the Americas.


Human Evolution: Concepts, History and Theory (Biological Sciences 673)

Introduction to Ethnomusicology (Music 680) 901–902 Field Research 901, fall; 902, spring. Credit to be arranged. Hours to be arranged. Staff.

Arabic and Aramaic

See Department of Near Eastern Studies.

Archaeology


Archaeology is an interdisciplinary field at Cornell, which is one of the few universities in the United States to offer a separate archaeology major. Program faculty members, affiliated with several departments, coordinate course offerings and help students identify opportunities for fieldwork, graduate study, and professional positions.

The Major

The basic introductory course for both majors and nonmajors is Archaeology 100. This course covers the broadest range of archaeology in terms of area and time and deals with method as well as results. Those with a fairly serious interest, particularly prospective majors, are encouraged to take the optional one-hour section, Archaeology 101, which provides practical experience with archaeological materials. Archaeology 301, which considers research design, and Archaeology 302, which examines interpretive frameworks, are especially recommended for majors.

Since the major draws on the teaching and research interests of faculty from many departments in order to present a broad view of the archaeological process, a student interested in the archaeology major should discuss his or her course of study with a participating faculty member as early as possible. In some areas of specialization, intensive language training should be coordinated with other studies as early as the freshman year.

As prerequisite to the major a student must complete Archaeology 100. Once admitted to the major, the student must take an additional 36 credits in courses from the archaeology list, chosen in consultation with the major adviser. These courses should provide exposure to a broad range of archaeologically known cultures and the methods of revealing and interpreting them. They must be distributed as follows:

1. At least two courses from each of the categories below (totaling at least 30 credits, including 16 at the 300 level or above): Prehistory and Interdisciplinary Approaches (B) Old World Archaeology (C) New World Archaeology (D)

2. At least two related courses (list available in Archaeology Program office)

Honors. Honors in archaeology is awarded on the basis of the quality of an honors essay and the student's overall academic record. Candidates for the honors program should consult with the director of undergraduate studies before the beginning of the senior year. The honors essay is normally prepared in consultation with a faculty adviser during the senior year; students may enroll in Archaeology 300 for this purpose.

Fieldwork. Every student should gain some practical experience in archaeological fieldwork on a project authorized by his or her adviser. This requirement may be waived in exceptional circumstances. The Jacob and Hedwig Hirsch bequest provides support for a limited number of students to work at excavations sponsored by Cornell and other approved institutions.

The Concentration

Students in Cornell schools and colleges other than Arts and Sciences may elect a concentration in archaeology. To concentrate in archaeology, the student must complete Archaeology 100 with a grade of C or better and at least four advanced courses in archaeology, distributed among the three groups stipulated in (1) in the description of the major, above. Concentrators are eligible for Hirsch Scholarships in support of fieldwork.

Freshman Seminars

For course descriptions see the Freshman Seminar brochure.

A. Introductory Courses and Independent Study Courses

100 Introduction to Archaeology Spring. 3 credits. MWF 1:25. 2 evening prelims. A. Ramage. A broad introduction to archaeology—the study of material remains to answer questions about the human past. The history, methods, and interpretive frameworks of archaeology are presented, followed by a survey of the archaeological record from human origins, through the development of food production, to the rise and spread of civilizations. Guest lectures by members of the Cornell Archaeology Program are an integral part of the course.

101 Introduction to Archaeology, Section Spring. 1 credit. Limited to 35 students. Optional section to be taken concurrently with Archaeology 100. Prospective archaeology majors are encouraged to participate in this section, although it is open to all interested students.

T 11:40 A. Ramage. A series of practical and special topics. The section includes analysis of archaeological materials, demonstrations, and visits to campus facilities.

300 Individual Study in Archaeology and Related Fields Fall or spring. Credit to be arranged. Prerequisites: Archaeology 100 or permission of instructor. Hours to be arranged. Staff.

Students pursue topics of particular interest with the guidance of a faculty member.
B. Theory and Interdisciplinary Approaches

203 Early People: The Archaeological and Fossil Record (also Anthropology 203) Spring. 3 credits. T R 11:40—12:55. Staff. A survey of the archaeological and fossil record of human evolution. Contributions by researchers from a variety of disciplines are highlighted, as are the discoveries, personalities, and controversies that have enlivened the study of human evolution for more than a century. Critical evaluation of evidence and interpretations will be stressed. Demonstrations and films supplement the lectures.

301 Archaeological Research Design Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1987—88. J. S. Henderson, T. P. Voerman. Archaeological practice demands careful definition of research questions and appropriate strategies before excavation or other fieldwork begins. Critical information lies in the arrangement and associations of objects and structures; this context should be a basic concern of any field investigator. Particularly when it is destroyed by excavation. The course relies on case studies to illustrate how surveys, excavations, and analytical techniques must be tailored to solving specific problems. An undergraduate seminar especially recommended for archaeology majors but open to anyone with a serious interest in archaeology.

302 Approaches to Archaeology Fall. 4 credits. Prerequisite: permission of instructor. T R 2:55—4:10. Staff. An exploration of the concepts that have shaped modern archaeology. The course briefly examines the history of theoretical orientations in archaeology, then considers the variety of perspectives and interpretive frameworks that guide present-day investigations. Case studies illustrate the implications of the nature of the archaeological record for reconstructing subsistence and economic systems, trade, social and political organization, demography, and ideology. An undergraduate seminar especially recommended for archaeology majors but open to anyone with a serious interest in archaeology.

308 Dendrochronology of the Aegean (also Classics 309) Fall or spring. 4 credits. Limited to 10 students. Prerequisites: Archaeology 100 or Classics 220, and permission of instructor. M 12:00—2:15, two labs to be arranged. P. I. Kuniholm. Participation in a research project of dating modern and ancient tree-ring samples from the Aegean and Mediterranean. Supervised reading and laboratory work. A possibility exists for summer fieldwork in Greece or Turkey.

317 Stone Age Archaeology Fall. 4 credits. T R 1:25—2:40. Staff. A survey of current approaches to the archaeological record of Stone Age peoples, from the earliest sites to those of recent times. Case studies are used to illustrate the implications of archaeological occurrences, excavation procedures, and analytical methods. Multidisciplinary efforts to expand our knowledge of prehistoric lifeways and behaviors are a major concern of the course.

356 Practical Archaeology (also Classics 356) Spring. 4 credits. Prerequisite: one course in archaeology. T R 2:30—3:45 plus lab to be arranged. J. Coleman. The fundamentals of archaeological fieldwork, including techniques of excavation and recording. Hands-on experience in cataloging of ancient objects in the Herbert F. Johnson Museum of Art and the collection of the Department of Classics and with surveying equipment such as the dumpy level. No previous fieldwork background required. Especially recommended for those planning to participate in summer field programs such as the Cornell project at Halai and East Lokris in Greece.

396 Public Archaeology (also Anthropology 496) 4 credits. Not offered 1987—88; next offered fall 1988. [Interpretation of the Archaeological Record (Anthropology 352) Fall. 4 credits. Not offered 1987–88.]

1987–88.]

[Archaeological Research Methods (Anthropology 358) Not offered 1987—88.]


[Seminar in Archaeology (Anthropology 493) Fall. Not offered 1987—88.]

Hunters, Gatherers, and the Origins of American Agriculture (Anthropology 663) Fall. 4 credits. Prerequisites: Anthropology 356 or permission of instructor. Open to qualified undergraduates. W 12:20—2:15. T. F. Lynch. The transition from hunting and gathering to agricultural subsistence, with particular attention to demographic, ecological, and coevolutionary factors. Topics to be emphasized are the history of thought on agricultural origins, archaeological evidence bearing on these theories, contrasts and conflicts between Western and non-Western systems, and the effects of agricultural instability and environmental degradation, particularly in the Americas.


Geomorphology (Geological Sciences 441) Fall. 3 credits. Prerequisite: Geology 102 or 201, or permission of instructor. Lec, T R 9:05; lab, T 2—4:30. A. L. Bloom. Origin of landforms and description in terms of structure, process, and stage.

Glacial and Quaternary Geology (Geological Sciences 442) Spring. 3 credits. Prerequisite: Geology 441 or permission of instructor. 2 labs, 1 lab; several Saturday field trips. A. L. Bloom. Glacial processes and deposits and the stratigraphy of the Quaternary period.

Seminar in Methods of Art History (History of Art 599) Spring. 4 credits. Not offered 1987—88.]

C. Old World Archaeology

221 Minoan-Mycenaean Art and Archaeology (also Classics 221 and History of Art 221) Fall. 3 credits. Students may not obtain credit for both this course and Classics 319. T R 10—11:25, P. I. Kuniholm. The birth of civilization in Greece and the Aegean Islands during the Bronze Age. The main focus is on the rise and fall of Minoan Crete and Mycenaean Greece, with consideration given to the nature and significance of Aegean interactions with Egypt, the Near East, and Anatolia.

223 Archaeology in Action II (also Classics 233) Spring. 3 credits. Prerequisites: Archaeology 100 or Classics 220, and permission of instructor. Not offered 1987—88. P. I. Kuniholm. Objects from the Classical, Hellenistic, and Roman periods are "dug" out of Cornell basements, identified, cleaned, restored, cataloged, and photographed and are considered in their appropriate historic, artistic, and cultural contexts.

275 Ancient Seafaring (also Near Eastern Studies 261) Fall. 3 credits. T R 1:25—2:40. D. I. Owen. A survey of the history and development of archaeology under the sea. The role of nautical technology and seafaring among the maritime peoples of the ancient Mediterranean world—Canarians, Minoans, Mycenaean, Phoenicians, Hebrews, Greeks, and Romans—as well as the riverine cultures of Mesopotamia and Egypt. Evidence for maritime trade, economics, exploration and colonization, and the role of the sea in religion and mythology are discussed.


Introduction to Classical Archaeology (Classics 220 and History of Art 220) Spring. 3 credits. M W F 10:10–J. Coleman. The archaeology of the ancient Greeks and Romans as seen from a critical perspective. Major developments in Classical archaeology will be traced from treasure hunting to modern scientific research. Examples illustrating various approaches will be chosen: the sculpture, vase painting, and architecture of the ancient Greeks, from the geometric period through the Hellenistic, and the art of the Romans from the early Republic to the late Empire.

Greek and Roman Mystery Religions (Classics 237) Spring. 3 credits. Not offered 1987—88. K. Clinton.

[Arts and Monuments of Athens (Classics 320 and History of Art 320) Spring. 4 credits. Prerequisite: Classics 220 or permission of instructor. Not offered 1987—88.]

Research Questions in Mediterranean Archaeology (Classics 450) Not offered 1987—88.]

Graduate Seminar in Bronze Age Archaeology (Classics 628) Fall. Not offered 1987—88. J. Coleman.

Seminar in Classical Greek Archaeology: Graduate Seminar in Classical Greek at the University of Athens (Classics 630) Fall. 4 credits. Not offered 1987—88.]

Ancient Greece from Homer to Alexander the Great (History 265) 4 credits. Fall. M W 11.15; disc, T 12:20 or 2:30 or W 3:35. B. Strauss. A survey of Greece from the earliest times to the end of the Classical period in the late fourth century B.C. The course focuses on the Greek genius: its causes, its greatness, its defects, and its legacy. The Heroic Age, the city-state, ancient democracy, and the intellectual ferment of the Greek Enlightenment are the main topics of study. Readings in translation from Homer, Aristophanes, Sophocles, Herodotus, Thucydides, Plato, and Aristotle from the evidence of ancient inscriptions, coins, art, and architecture.

[Arts of the Roman Empire (History of Art 322) Fall. 4 credits. Not offered 1987—88. A. Ramage.]

Greek Vase Painting (History of Art 325 and Classics 325) Fall. 4 credits. M W F 9:05. A. Ramage. A stylistic and iconographical approach to an art in which the Greeks excelled. The course will be arranged chronologically from the early (eleventh century B.C.), anonymous beginnings to the "personal" hands of identifiable masters of the fifth and fourth centuries B.C. Styles other than Attic will be stressed.

Greek and Roman Coins (History of Art 327 and Classics 327) Spring. 4 credits. Prerequisite: permission of instructor. M 2:30–3:30 plus lab to be arranged. P. Kuniholm. The varied issues of Greek cities and the Roman Empire are considered as art objects as well as economic and historical documents. The changes in design, value, and metals from the origins of coinage to the late Roman period are studied. Lectures, student presentations, and work with actual examples.
Architecture of the Middle Ages (History of Art 332 and Architecture 382) Fall. 4 credits. M. W. F. 12:20. G. Calkins. A survey of medieval architecture from the early Christian period to the late Gothic (A.D. 300–1500). Considerable emphasis will be placed on the development of structural systems and on the form, function, and meaning of important medieval buildings.

Seminar on Roman Art (History of Art 427) Fall. 4 credits. Prerequisite: permission of instructor. T. 2:30–4:30. A. Ramage. Topic for fall 1987: portraiture and biography. Styles in Roman portraiture will be examined, from its beginnings in the Etruscan period to its transformation in early Byzantine times. We will also consider accounts of the subjects’ lives and appearances to see if they have colored appreciation of the sculptors’ work or might be used for better understanding of the representation of well-known people.


The History and Archaeology of Ancient Israel to 450 B.C.E. (Near Eastern Studies 243) Spring. 4 credits. T. R. 12:20. D. I. Owen. A detailed survey of the history and archaeology of the land of Canaan from the traditional origins of the Israelite tribes in the early second millennium/middle Bronze Age (ca. 2000 B.C.E.) through the Babylonian exile to the arrival of Ezra and Nehemiah (ca. 450 B.C.E.). Lectures on, and discussions of, biblical and Near Eastern literary sources relating to the history of ancient Israel, as well as an analysis of the archaeological evidence, will form the basis of the course.


D. New World Archaeology

361 Field Archaeology in South America (also Anthropology 361) Spring. 10 credits. Prerequisite: permission of instructor. Not offered 1987–88. Hours to be arranged (off campus in Chile). T. F. Lynch.

The Peopling of America (Anthropology 354) Fall. 4 credits. T. R. 8:40–9:55. T. F. Lynch. Prehistoric discovery of the New World, beginning with American Indian origins in Asia and ending with the largely unrecorded European medieval contact with North America. Major topics include crossing the Bering land bridge, big-game hunting and extinctions, postglacial adaptations to changing environments, diversified subsistence in the eastern woodlands, agricultural civilizations of the Midwest and Southwest, and Eskimo and Norse exploration and settlement across the Arctic and North Atlantic.


The Archaeology of South America (Anthropology 356) Spring. 4 credits. T. R. 8:40–9:55. T. F. Lynch. Origins and development of South American agriculture and civilization, with special attention to Peru, the Andean heartland, and diffusion into the lowland forests and archipelagos. Major topics include the domestication of plants and animals, the rise of temple-based cults and great art styles, the formation of militaristic states, regional interaction and the Inca empire, and the possibility of transoceanic influences.


Asian Studies


The Department of Asian Studies encompasses the geographical areas of East Asia, South Asia, and Southeast Asia and offers courses in most of the disciplines of the social sciences and the humanities. Asian studies courses through the 400 level are taught in English and are open to all students in the university. Some of these courses may be counted toward majors in other departments; others fulfill the humanities distribution requirement.

The Major

The applicant for admission to the major in Asian studies must have completed at least one area studies course selected from among those listed under the Department of Asian Studies and must receive permission for admission to the major from the director of undergraduate studies. The student must have received a minimum grade of C in this course and in all other courses counted toward the major.

A student majoring in Asian studies is required to complete two courses at the 200 level (a minimum of 6 credits with a grade of C or better) in one of the Asian languages offered at Cornell. The major consists of at least 30 additional credits (which may include up to 6 credits of further language study) selected by the student in consultation with his or her adviser from among the courses listed under the Department of Asian Studies and numbered 300 and above. Majors in Asian studies normally specialize in the language and culture of one country and often choose an additional major in a traditional discipline.

Concentration in Southeast Asia Studies

A candidate for the Bachelor of Arts or Bachelor of Science degree at Cornell may take a concentration in Southeast Asia studies by completing 15 credits of course work, including a history course and at least two additional courses in the area of concentration. Students taking courses in Southeast Asia studies are members of the Southeast Asia Program and are assigned an adviser from the program faculty. Such students are encouraged to commence work on a Southeast Asian language and to take advantage of summer intensive language training.

Distribution Requirement for Nonmajors

Humanities: any two courses in Asian art, literature, or religion given by the Department of Asian Studies or listed there under the areas of China, Japan, South Asia, and Southeast Asia, excluding only freshman writing seminars and courses given outside the College of Arts and Sciences. A reasonable sequence is formed by taking any two courses in the same area. Alternative sequences will, under special circumstances, be considered but require the permission of the director of undergraduate studies. Any two of the following three 200-level courses form a sequence that satisfies the humanities distribution requirement: Asian Studies 211, 212, and 215.

Social Sciences: any two courses in Asian anthropology, economics, government, linguistics, or sociology given by the Department of Asian Studies or listed there under the areas of China, Japan, South Asia, and Southeast Asia, excluding only freshman writing seminars and courses given outside the College of Arts and Sciences. A reasonable sequence is formed by taking any two courses in the same area. Alternative sequences will, under special circumstances, be considered but require the permission of the director of undergraduate studies.

History: any two courses in Asian history given by the Department of History and listed under the Department of Asian Studies or listed there under the areas of China, Japan, South Asia, and Southeast Asia, excluding only freshman writing seminars and courses given outside the College of Arts and Sciences. A reasonable sequence is formed by taking any two courses in the same area. Alternative sequences will, under special circumstances, be considered but require the permission of the director of undergraduate studies.

Honors. To be eligible for honors in Asian studies, a student must have a cumulative grade average of B+ in all Asian studies courses and must successfully complete an honors essay during the senior year. Students who wish to be considered for honors should apply to the director of undergraduate studies during the second term of their junior year. The application must include an outline of the proposed project and the endorsement of a faculty adviser. During the first term of the senior year the student does research for the essay in conjunction with an appropriate Asian studies course or Asian Studies 401. Students of China and Japan must also complete Asian Studies 611. By the end of the first term the student must present a detailed outline of the honors essay and have it approved by the faculty sponsor and the director of undergraduate studies. The student is then eligible for Asian Studies 402, the honors course, which entails writing the essay. At the end of the senior year, the student has an oral examination (with at least two faculty members) covering both the honors essay and the student's area of concentration.

Intensive Language Program (FALCON)

For those students desiring to accelerate their acquisition of Chinese, Japanese, or Indonesian, Cornell offers a full-time intensive language program, the Full-Year Asian Language Concentration (FALCON).
FALCON students spend six hours a day, five days a week, for periods of up to a full year studying only the language and thus are able to complete as many as twelve hundred hours of supervised classroom and laboratory work in one year. For further information, students should contact the FALCON Program Office, Department of Modern Languages and Linguistics, 203 Morrill Hall (telephone: 607/255-6457).

Study Abroad
Cornell participates in the Inter-University Program in Chinese Language Studies in Taipei, which offers intensive training in advanced spoken and written Chinese. Cornell is also an affiliated institution of the Council on International Educational Exchange, which offers intensive language training at Beijing University and language and area studies at Nanjing and Fudan universities.

Cornell is a class A member of the American Institute of Indian Studies, which offers fellowships in India for intensive language study in Hindi, Bengali, and Tamil. For further details contact the South Asia Program Office, 170 Uris Hall (telephone: 255-9933).

Freshman Writing Seminars


[103] Revolutions and Social Values in Modern Chinese Literature Fall. 3 credits.
A scholar of Asian studies once asked that with the revolutions, rebellions, civil wars, and foreign incursions that have plagued China over the past century, "is there a 'modern' Chinese literature?" This course is designed to probe into the twentieth-century literary scene, rich in its variety of experience, its power of description, and its intensity of emotion. We will trace themes through the dramatic turns of events and try to ascertain what has remained constant in the modern era as well as what has changed in the literature with the changes in political life. Preference will be given to the study of short fiction, but poetry, novel, and essay are also forms that we will consult as artifacts of revolutions and social values in modern Chinese literature.

104 Three Ways of Thought Fall. 3 credits.
TR 1:25–2:40. Staff.
Through a study of classical philosophical texts this course introduces students to three salient systems of belief in East Asian civilization: Confucianism, Taoism, and Zen Buddhism. Assigned readings will not be lengthy, but students should expect to devote their attention to close analysis of the text and to consider how writing style affects the content a given author may want to convey. We will ask such questions as "What is the intrinsic nature of freedom?" "What is the proper role of humans in society?" "How do each of the schools account for immortality?" "How can one confidently ascertain truth?" Students are encouraged to consider applications of Chinese thought to their own lives and to discern rhetorical techniques that will enhance their own writing styles.

105 Feminine and Masculine Ideals in Japanese Culture (also Women's Studies 105) Spring. 3 credits.
M/W 10:10. K. Brazell and staff.
In its long history Japan has developed a large number of role models—the aristocratic, poet-priest, warrior, entertainer, "salary man," and "education mama"—and idealized them in its literature and art. Using these ideals as its subject matter, the seminar will give students practice in reading texts closely, analyzing ideas, and writing various types of papers. Through studying Japanese concepts of femininity and masculinity, the students will not only explore a new culture but will also gain new perspectives on their own cultures.


111 Perspectives on South Asia Fall. 3 credits.
Through classical texts, ethnographies, fiction, and films this course will explore the structure of South Asian village society. Topics to be discussed include the structure of village life, caste and class, kinship and gender, and the impact of Westernized urban society on traditional rural life-styles. Social scientific writings will be complemented by examples from assorted literary genres.


Related Freshman Writing Seminars in Other Departments

Comparative Literature 141 Sanskrit Masterpieces in Translation

V. Koschmann.

History of Art 105 Traditions in Japanese Art


General Education Courses

211 Introduction to Japan Fall. 3 credits. M/W 11:15–dis. to be arranged. K. Brazell.
An interdisciplinary introduction to Japanese culture especially designed for students not majoring in Asian studies. The first part of the course focuses on traditional aspects of Japanese culture that are still important today, while the second part analyzes contemporary society from a variety of perspectives. Guest lecturers from five or six departments speak on their areas of expertise.

212 Introduction to China Spring. 3 credits. (4 credits with a special project; consult instructor for information.)
TR 1:25; disc. R 2:30 (3 sections). F 10:10 (2 sections); or F 11:15 (2 sections). E. M. Gunn and staff.
An interdisciplinary introduction to Chinese culture especially designed for students not majoring in Asian studies.

215 Introduction to South Asian Civilization Spring. 3 credits (4 credits with a special project; consult instructor for information.)
A general introduction to the civilizations of South Asia designed for nonmajors. Faculty members from several departments will focus on interpretive themes in the study of South Asia: ethnic and linguistic diversity, tradition, and change. The course will provide an introduction to the geography, arts, religions, and history of India, as well as to those of other modern states of South Asia that share its cultural heritage.

220 The Poet in Asia Spring. 3 credits.
W 7:30–9:30 p.m. D. McCann.
Some of the most interesting and instructive writing about what poetry is, is to be found in novels, prefaces to anthologies, and other unlikely places. This course will consider several questions about poetry in Asia: What is poetry in Asian perspectives? What is its connection with song? Is it a normal state of mind and language? Why do people do it? What is its purpose? What is its power? And what is a poet? Works to be read and discussed will include the prefaces to the Chinese Book of Odes and to the Japanese Kokinshu, the first of the imperial anthologies; Nadezda Mandelstam's Hope against Hope; Anita Desai's in Custody; Unforgettable Things, an autobiographical collection of poems by the Korean poet So Chongu; and selections about their work by such translators of Asian poetry as Pound, Payne, and Fitzgerald.

Asia—Literature and Religion Courses

The following courses are taught entirely in English and are open to any Cornell student.

250 Introduction to Asian Religions Fall. 3 credits.
A general introduction to the major religions of Asia (Hinduism, Buddhism, Taoism, Zoroastrianism, and Islam), their local interaction, and their impact on the cultures of India, China, and Japan. Based on readings of English translations of the canonical texts (Bhagavad-Gita, Dhammapada, Lotus Sutra, Tao-te ching, Kojiki), discussion will stress the relationships between the symbolic and mythological systems, as well as the rituals and the contemplative practices of each tradition. Two guided papers.

307 Asian Dance and Dance Drama (also Theatre Arts 307) Fall or spring. 3 credits. May be repeated for credit. Section 1: Indian Dance. Hours to be arranged. Section 2: Japanese Noh Theatre. Not offered 1987–88. Section 3: Indonesian Dance Theatre. Hours to be arranged. Spring. Section 4: topic to be announced.


A study of traditional forms of Japanese theatre. Topics will include ritual and theatre, noh and kyogen, kabuki and the puppet theaters, and contemporary and theatrical use of traditional forms. Special emphasis will be placed on dramaturgy, acting styles, performance aesthetics, and theories of performer training.

The myths of India have been both narrated simply in popular story and elaborated at length in literary works. The course will examine some of the great mythic cycles of Hinduism and Buddhism and the ways in which they are presented in diverse literary genres. A study of materials from epics, romance, drama, and lyric poetry should help us understand both the powers of different traditional genres and the varied meanings of mythic themes in Indian life.

A study of the relationships between the main currents of Indian religion. The course will first focus on the Hindu tradition and its holistic worldview within the context of the caste system. It will then describe the rise of Jainism and Theravada and Mahayana Buddhism, as well as Hindu and Buddhist Tantrism, as religious phenomena reflecting the emergence of individualism.

352 East Asian Buddhism Spring. 4 credits. No prerequisites: Asian Studies 250 or 351 strongly recommended.
This course will focus on the expansion of Mahayana Buddhism in East Asia and its impact on the cultures of China, Korea, and Japan. It will examine the integrative or subversive role played by various trends of Mahayana Buddhism, the interaction between its official and popular components, and its adaptation to the local contexts. Two guided papers.
355 Japanese Religions Fall. 4 credits. 
T R 2:30–3:45. Staff.
A historical and phenomenological approach to the Japanese religious traditions with an emphasis on a system of interaction, in order to attempt to establish the form of the major forces that have shaped Japanese culture. 

[357 Chinese Religions Spring. 4 credits. Not offered 1987–88.]

371 Chinese Philosophical Literature Fall. 4 credits. M W F 2:30–3:35. T. L. Mei
Readings in English translation of Confucian, Taoist, and Buddhist works. 


A survey of the principle works in English translation, the course introduces fiction, drama, essay, and poetry of China beginning with the Republican era and continuing up to the present in the People's Republic and Taiwan, with attention to social and political issues and literary theory. One session each week will be devoted to discussions.


An introduction (in English translation) to the great poets of premodern Japan. This course will cover court poetry, linked verse, haiku, poetic memoirs, travel diaries, and poem tales written between the eighth and the eighteenth centuries.

376 Modern Japanese Literature Fall. 4 credits. T R 11:40–12:50. N. Sakai.
The course examines developments in Japanese literature from the Meiji restoration (1868) onward. Topics will include the interaction of popular and "pure" literature, the Edo revival of the 1890s, the social context of the Meiji psychological novel, the poetry and prose by women writers, the modernist and proletarian literature movements, writings of Hiroshima and Nagasaki, and the postwar vision of Ishimure, Morisaki, Mishima, and others. Special attention will be given to the revision of modern Japanese literary history recently articulated by Japanese postmodern critics.


[379 Southeast Asian Literature in Translation Fall or spring. 4 credits. Not offered 1987–88.]


[400 The Japanese Noh Theater and Modern Dramatists (also Comparative Literature 400) Spring. 4 credits. Not offered 1987–88.]

[401 Asian Studies Honors Course Fall. 4 credits. Intended for seniors who have been admitted to the honors program. Staff. Supervised reading and research on the problem selected for honors work.]

402 Asian Studies Honors: Senior Essay Fall or spring. 4 credits. Prerequisite: admission to the honors program. The student, under faculty direction, prepares an honors essay.

403 Asian Studies Supervised Reading Fall. 4 credits. Prerequisite: permission of instructor. Open to majors and other qualified students. Intensive reading under the direction of a member of the staff.

403.1 Readings in Modern Korean Literature Fall. 4 credits. Limited to 10 students. Prerequisite: permission of instructor. T R 10:30–11:45. C. Hernandez
Extended readings of major works by such poets as So Wo, Man Hae, Yun Torgu, Yi Yuksa, Kim Chi Ha, Ko Lin, Pak Mogwo, So Chongju, and others of fiction by writers such as Yi Kwangsu, Kim Tongni, Kim Tongin, Yi Sang, Hwang Sunwon, Yi Mun'gu, and Yi Hooch'ol. Depending on the interests and Korean language abilities of the students: some or all of the readings will be in the original.

601 Southeast Asia Seminar: Indonesia Fall. 4 credits. W 3–5. B. Anderson.

602 Southeast Asia Seminar: Philippines Spring. 4 credits. Hours to be arranged. Visiting professor C. Hernandez.

[604 Southeast Asia Seminar Not offered 1987–88.]

[607–608 The Pure Society Revisited (also Government 653) Fall. 4 credits. 607 may be taken independently for credit; 607 is a prerequisite for 608. Not offered 1987–88.]

611 Chinese and Japanese Bibliography and Methodology Spring. 1 credit. Prerequisite: permission of instructor. Required of honors students and M.A. candidates.

621 Seminar on South Asia Topic to be announced.

650 Seminar on Asian Religions Spring. 2–4 credits. Prerequisite: permission of instructor. Hours to be arranged. Staff.

676 Southeast Asia Research Training Seminar Contact the Southeast Asia Program, 120 Uris Hall, 255-2378, for more information.

701–702 Seminar in East Asian Literature 701, fall; 702, spring. 1–4 credits. Hours to be arranged. Staff.

703–704 Directed Research For additional courses on Asian religion, see "Related Courses" in the China and Japan area courses listing.

Asia—General Courses

401 Asian Studies Honors Course Fall. 4 credits. Intended for seniors who have been admitted to the honors program. Staff. Supervised reading and research on the problem selected for honors work.

402 Asian Studies Honors: Senior Essay Fall or spring. 4 credits. Prerequisite: admission to the honors program. The student, under faculty direction, prepares an honors essay.

403–404 Asian Studies Supervised Reading Fall, spring, or both. Credit to be arranged. Prerequisite: permission of instructor. Open to majors and other qualified students. Intensive reading under the direction of a member of the staff.
Related Courses in Other Departments

- Religion, Family, and Community in China (Anthropology 343)
- Chinese Government and Politics (Government 347)
- Comparative Revolutions (Government 350)
- [Readings on the Great Cultural Revolution (Government 447) Not offered 1987–88.]
- Politics of China (Government 645)
- [China and the West before Imperialism (History 193) Not offered 1987–88.]
- Early Warfare, East and West (History 360)
- History of China up to Modern Times (History 393)
- History of China in Modern Times (History 394)
- Undergraduate Seminar in Medieval Chinese History (History 492)
- [Self and Society in Late Imperial and Twentieth-Century China (History 493) Not offered 1987–88.]
- [Art and Society in Modern China (History 499) Not offered 1987–88.]
- [Chinese Historiography and Source Materials (History 691) Not offered 1987–88.]
- Problems in Modern Chinese History (History 693–694) [694 not offered 1987–88.]
- Seminar in Medieval Chinese History (History 791–792)
- [Seminar in Modern Chinese History (History 793–794) Not offered 1987–88.]
- [The Arts of Early China (History of Art 383) Not offered 1987–88.]
- Chinese Painting (History of Art 385)
- The Arts of Southeast Asia (History of Art 396)
- [The Arts in Modern China (History of Art 481) Not offered 1987–88.]
- [Chinese Art of the T’ang Dynasty (History of Art 483) Not offered 1987–88.]
- [Studies in Chinese Painting (History of Art 486) Not offered 1987–88.]
- Contemporary Chinese Society (Sociology 259)
- Other courses dealing extensively with China are Architecture 667–668; Government 347, 348, 350, 357, 446, and 645; History 190 and 191; History of Art 280, 381, 482, 580, and 596; Management MBA 586; and Sociology 342.

China—Language Courses

- Basic Course (Chinese 101–102)
- Cantonese Basic Course (Chinese 111–112)
- FALCON (full-time course, Chinese 161–162)
- Intermediate Chinese (Chinese 201–202)
- Intermediate Cantonese (Chinese 211–212)
- Advanced Chinese (Chinese 301–302)
- Chinese Conversation (Chinese 303–304)
- Linguistic Structure of Chinese I (Chinese 403)
- Linguistic Structure of Chinese II (Chinese 404)
- [Chinese Dialects (Chinese 405) Not offered 1987–88.]
- Readings in Modern Chinese (Chinese 411–412)
- Chinese Reading Tutorials (Chinese 413–414)
- [Chinese Dialect Seminar (Chinese 607) Not offered 1987–88.]

China—Literature Courses

- Introduction to Classical Chinese (Chinese 213–214)
- Chinese Philosophical Texts (Chinese 313)
- [Classical Narrative Texts (Chinese 314) Not offered 1987–88.]
- Readings in Modern Chinese Literature (Chinese 411–412)
- T’ang and Sung Poetry (Chinese 420)
- Directed Study (Chinese 421–422)
- [Readings in Literary Criticism (Chinese 424) Not offered 1987–88.]
- [Readings in Folk Literature (Chinese 430) Not offered 1987–88.]
- [Seminar in Chinese Poetry and Poetics (Chinese 603) Not offered 1987–88.]
- [Seminar in Chinese Fiction (Chinese 605) Not offered 1987–88.]
- Seminar in Folk Literature (Chinese 609)
- Advanced Directed Reading (Chinese 621–622)

Japan—Area Courses

- Japanese Society (Anthropology 345)
- Japanese Ethnology (Anthropology 645)
- Business and Labor in Politics Government 334)
- Politics in Contemporary Japan (Government 346)
- [Politics of Productivity: Germany and Japan (Government 430) Not offered 1987–88.]
- [Japan and the West (History 192) Not offered 1987–88.]
- [State, Society, and Culture in Japan to 1750 (History 397) Not offered 1987–88.]
- [State, Society, and Culture in Modern Japan (History 398) Not offered 1987–88.]
Japan—Language Courses

Basic Course (Japanese 101–102)

Accelerated Introductory Japanese (Japanese 123)

Introductory Japanese for Business Purposes (Japanese 141–142)

FALCON (full-time intensive course, Japanese 161–162)

Intermediate Japanese Reading I (Japanese 201–202)

Intermediate Japanese Conversation (Japanese 203–204)

Intermediate Japanese Reading I and Conversation (Japanese 205–206)

Transition to Intermediate Japanese Conversation (Japanese 223)

Intermediate Japanese for Business Purposes (Japanese 241–242)

Intermediate Japanese Reading II (Japanese 301–302)

Communicative Competence (Japanese 303–304)

Advanced Japanese Reading (Japanese 401–402)


Oral Narration and Public Speaking (Japanese 407–408)

Directed Readings (Japanese 421–422)

Introductory Japanese for Business Purposes (Japanese 541–542)

Intermediate Japanese for Business Purposes (Japanese 543–544)

Japan—Literature Courses

Introduction to Modern Literary Japanese (Japanese 405)

Introduction to Classical Japanese (Japanese 406)

Directed Readings (Japanese 421–422)

Seminar in Modern Literature (Japanese 611)

Seminar in Classical Literature (Japanese 612)

Advanced Directed Readings (Japanese 621–622)

South Asia—Area Courses

Food, Population, and Employment (Agricultural Economics 660)

Cultures and Societies of India, Nepal, and Sri Lanka (Anthropology 342)

Anthropological Approaches to the Study of Buddhism in Asia (Anthropology 619)

Himalayan Issues, Problems, and Prospects (Anthropology 623)

South Asia: Readings in Specific Problems (Anthropology 640–641)


Introduction to South Asian Civilizations (Asian Studies 215)

Introduction to Asian Religions (Asian Studies 250)

The Religious Traditions of India (Asian Studies 351)

South Asia Seminar: Topic to Be Announced (Asian Studies 621)

South Asia Seminar (Asian Studies 622)

Communication in the Developing Nations (Communication Arts 624)

Pessimism (Comparative Literature 440)

Sanskrit Masterpieces in Translation (Comparative Literature 441)

Fictions of India (English 353)

India: Social and Economic Change in a Democratic Polity (Government 351)

[Agrarian Change in South Asia—Politics, Society, and Culture (Government 651) Not offered 1987–88]

[Buddhist Art in Asia (History of Art 381) Not offered 1987–88]

[Studies in Indian and Southeast Asian Art (History of Art 386) Not offered 1987–88]

India as a Linguistic Area (Linguistics 341)

Dravidian Structures (Linguistics 440)

Indo-Aryan Structures (Linguistics 442)

Elementary Pali (Linguistics 640)

Elementary Sanskrit (Linguistics 641–642)

Directed Research (Linguistics 701–702)

Rural Sociology and Agrarian Problems (Rural Sociology 205)

Gender Relations and Social Transformation (Rural Sociology 425)

Politics of Policy Planning and Evaluation (Rural Sociology 675)

Applications of Sociology to Development Programs (Rural Sociology 751) Not offered 1987–88

Sociotechnical Aspects of Irrigation (Rural Sociology 754, Agricultural Engineering 754, and Agricultural Economics 754)

Other courses dealing extensively with South Asia are Anthropology 321 and 611; Agricultural Economics 464; Communication Arts 626; Government 387 and 687; History 190 and 191; History of Art 280, 482, 580, and 596.

South Asia—Language Courses

Elementary Bengali (Bengali 121–122)

Intermediate Bengali (Bengali 211–212)

Basic Course (Hindi 101—102)

Hindi Reading (Hindi 201–202)

Composition and Conversation (Hindi 203–204)

Readings in Hindi Literature (Hindi 301–302)

Advanced Composition and Conversation (Hindi 303–304)

Basic Course (Nepali 101–102)

Intermediate Nepali Conversation (Nepali 201–202)

Intermediate Nepali Composition (Nepali 203–204)

Basic Course in Sinhala (Sinhalese 101–102)

Sinhala Reading (Sinhalese 201–202)

Composition and Conversation (Sinhalese 203–204)

Basic Course (Tamil 101–102)

Basic Course (Telugu 101–102)

Telugu Reading (Telugu 201–202)

Southeast Asia—Area Courses

Microeconomic Issues in Agricultural Development (Agricultural Economics 664)

Sociotechnical Aspects of Irrigation (Agricultural Economics 754, Agricultural Engineering 754, Rural Sociology 754, and Government 644)

[Meaning across Cultures (Anthropology 220) Not offered 1987–88]

[Ethnographic Description (Anthropology 306) Not offered 1987–88]


Histories of Ideas of Exotica (Anthropology 325)

[Ethnology of Island Southeast Asia (Anthropology 334) Not offered 1987–88]

[Peoples and Cultures of Mainland Southeast Asia (Anthropology 335) Not offered 1987–88]

[Balinese Culture: Description and Comparison (Anthropology 410) Not offered 1987–88]

Ceramic Art of Asia (History of Art 482)
Studies in Asian Art (History of Art 580)
[Problems Methodology Seminar (History of Art 590) Not offered 1987–88]
Farming Systems Research (International Agriculture 606)
Sociolinguistics (Linguistics 405–406)
Field Methods (Linguistics 600)
Seminar in Southeast Asian Languages (Linguistics 653–654)
[Austronesian Linguistics (Linguistics 655–656) Not offered 1987–88]
Directed Research (Linguistics 701–702)
Tibeto-Burman Linguistics (Linguistics 753)
Introduction to Musics of the World (Music 103)
Cornell Gamelan Ensemble (Music 445–446)
[Introduction to Ethnomusicology (Music 680) Not offered 1987–88]
Rural Sociology and World Development Problems (Rural Sociology 205)
Sociotechnical Aspects of Irrigation (Rural Sociology 754, Agricultural Economics 754, and Government 644)
Special Seminar (Rural Sociology 771)
[Race and Ethnicity (Sociology 364) Not offered 1987–88]
Human Fertility in Developing Nations (Sociology 404)
Social Demography (Sociology 430)
[Social and Demographic Change in Southeast Asia (Sociology 439) Not offered 1987–88]
Other courses dealing with Southeast Asia are
Agronomy 314, 471, and 480; Anthropology 102, 312, and 420; and Government 692; History 303, 400, International Agriculture 606, 609, and 703; Nutritional Sciences 680 and 695.
Southeast Asia—Language Courses
Basic Course (Burmese 101–102)
Burmese Reading (Burmese 201–202)
Composition and Conversation (Burmese 203–204)
Advanced Burmese Reading (Burmese 301–302)
Burmese Directed Individual Study (Burmese 401–402)
Basic Course (Cambodian 101–102)
Cambodian Reading (Cambodian 201–202)
Composition and Conversation (Cambodian 203–204)
Advanced Cambodian (Cambodian 301–302)
Directed Individual Study (Cambodian 401–402)
Structure of Cambodian (Cambodian 404)
Basic Course (Cebuano [Bisayan] 101–102)
Elementary Course (Cebuano 101–102)
FALCON (full-time intensive course, Indonesian 161–162)
Indonesian Reading (Indonesian 201–202)
Composition and Conversation (Indonesian 203–204)
Linguistic Structure of Indonesian (Indonesian 300)
Readings in Indonesian and Malay (Indonesian 301–302)
Advanced Indonesian Conversation and Composition (Indonesian 303–304)
Directed Individual Study (Indonesian 305–306)
Advanced Readings in Indonesian and Malay Literature (Indonesian 401–402)
Elementary Javanese (Javanese 131–132)
Intermediate Javanese (Javanese 133–134)
Directed Individual Study (Javanese 203–204)
Basic Course (Tagalog 101–102)
Tagalog Reading (Tagalog 201–202)
[Linguistic Structure of Tagalog (Tagalog 300) Not offered 1987–88]
Basic Course (Thai 101–102)
Thai Reading (Thai 201–202)
Composition and Conversation (Thai 203–204)
Advanced Thai (Thai 301–302)
Thai Language (Thai 303–304)
Directed Individual Study (Thai 401–402)
Basic Course (Vietnamese 101–102)
Vietnamese Reading (Vietnamese 201–202)
Composition and Conversation (Vietnamese 203–204)
Advanced Vietnamese (Vietnamese 301–302)
Directed Individual Study (Vietnamese 401–402)

Astronomy

Professors and graduate students in astronomy at Cornell are very active in the national space exploration program as well as in studies of infrared astronomy and theoretical astrophysics. Cornell operates two local optical observatories and the world's largest radio telescope at Arecibo, Puerto Rico.

The department offers a number of courses that are of general interest, have few or no prerequisites, and are not intended for the training of professional astronomers. These courses are numbered from 101 to 332. The last of these, Astronomy 332, requires calculus and a year of college physics, and Astronomy 111-112 require at least coregistration in beginning calculus. The other courses have no college prerequisites at all.

Courses numbered above 400 are intended for students who have had two to three years of college physics and at least two years of college mathematics. Astronomy 440, Independent Study, permits students to engage in individual research projects under the guidance of a faculty member.

There is no undergraduate major in astronomy at Cornell but anyone who is interested in becoming astronomers should Major in physics and mathematics. Cornell operates two local programs as well as in studies of infrared astronomy and theoretical astrophysics. The department believes that a major in physics and mathematics is the best preparation for the study of astronomy at the graduate level. Students who are interested in becoming astronomers should Major in physics as undergraduates. It is wise to get an early start in mathematics and physics.

Concentration

Students interested in astronomy are encouraged to supplement their major with a concentration in astronomy, which is somewhat less intensive than a major. All students are invited to visit the Space Sciences Building, see the exhibits on display there, and consult a faculty member about career plans or choice of courses.

Distribution Requirement

The distribution requirement in physical sciences is met by either of the following two sequences: Astronomy 101 and 102 or Astronomy 111 and 112.

Courses

101 The Nature of the Universe Fall. 4 credits. No prerequisites. Limited to 330 students (combined total with Astronomy 103: 450 students). Labs and discussions limited to 20 students each.

Lecs., M W F 11:15; labs, every other week: M or W 2:30-5 or M T W or T R 7:30-10 p.m.; disc, one hour every week: M or W 1:25, 2:30, 3:35, or 7:30 p.m., or T or R 2:30, 3:35, or 7:30 p.m. Y Terzian, labs, M. P. Haynes.

The physical nature of existence. An examination of the universe and our place in it and the possible existence of life and intelligence elsewhere in the cosmos. The nature of stars, galaxies, and quasi-stellar sources. The birth, evolution, and death of stars and the formation of the chemical elements, including discussions of supernovae, pulsars, neutron stars, and black holes. The physical state and composition of the interstellar material and its influence on the evolution of our galaxy. An introduction to the special and general theories of relativity. The nature of time. Modern theories of cosmology and the structure and evolution of the universe.

102 Our Solar System Spring. 4 credits. No prerequisites. Limited to 330 students (combined total with Astronomy 104: 430 students). Labs and discussions limited to 20 students each.

Lecs., M W F 11:15; labs every other week: M or W 2:30-5 or M T W or T R 7:30-10 p.m.; disc, one hour every week: M or W 1:25, 2:30, 3:35, or 7:30 p.m., or T or R 2:30, 3:35, or 7:30 p.m. J. R. Houck; labs, M. P. Haynes.

The evolution and our understanding of the formation and structure of the solar system will be discussed. Modern theories of the solar system will be compared with the results of the space program. The chemical basis of life and current ideas about the spontaneous appearance of life will be considered along with searches for life beyond the earth, both inside and outside the solar system.

103 The Nature of the Universe Fall. 3 credits. Limited to 120 students (combined total with Astronomy 101: 450 students). Limited to Astronomy 101 except for omission of the laboratory (see description above). This course does not satisfy the distribution requirement in physical sciences.

104 Our Solar System Spring. 3 credits. Limited to 100 students (combined total with Astronomy 102: 430 students). Limited to Astronomy 102 except for omission of the laboratory (see description above). This course does not satisfy the distribution requirement in physical sciences.

105 An Introduction to the Universe Summer 3 credits.

M-F 9:30-10:45. Staff.

Einstein's theories of special and general relativity, which brought about a fundamental change in our conceptual understanding of space and time, will be studied. Correspondence to, and conflicts with, common sense will be pointed out. Applications to various areas will be studied: in special relativity—space travel, equivalence of mass and energy, nuclear fission and fusion, and thermonuclear processes in the sun, in general relativity—motion of light and particles in curved space; stellar structure and evolution; and the question of whether the universe is open or closed.

111 Astronomy: Stars, Galaxies, and Cosmology Fall. 4 credits. Intended for engineering and physical sciences freshmen. Prerequisite: introductory calculus or coregistration in Mathematics 111 or 191.

Lecs., M W F 10:10, rec, one hour each week to be arranged, plus some evening observing periods. S. Beckwith.


112 The Solar System: Planets, Satellites, and Rings Spring. 4 credits. Intended for engineering and physical sciences freshmen. Prerequisite: introductory calculus or coregistration in Mathematics 111 or 191.

Lecs., M W F 10:10, rec, one hour each week to be arranged, possible evening observing labs to be arranged. S. Beckwith.

The origin of the solar system; celestial mechanics; tidal evolution; the physics and chemistry of planetary surfaces, atmospheres, and oceans; interior and planetary rings, asteroids, comets, and meteors; the search for other planetary systems.

201 Our Home in the Universe Spring. 3 credits.

T R 2:30-3:45. S. Beckwith, J. M. Cordes.

A general discussion of man's relation to the physical universe; the nature of space and time as understood in modern physics; the universe of galaxies and stars, and the particular system of planets and satellites encircling one such average star, our sun. The origin and evolution of the solar system as revealed by modern planetary exploration. The great uncertainties that remain.

215 Information and Knowledge in Science and Engineering (also Arts and Sciences 200) Fall. 4 credits. Not offered 1987-88.

T R 10:10-11:30 M. O. Harwit.

315 The Course of Science Fall. 4 credits. No prerequisites.

T R 10:10-11:35 M. O. Harwit.

The development of one scientific discipline—astronomy—is traced in detail from mythology to primitive cultures to quantitative theory tied in to a larger-scale structure of theoretical physics today. The role of novel ideas, physical and mathematical tools, and religious, social, military, and other factors is analyzed. Comparative developments in other branches of sciences in recent centuries, as well as the evolution of astronomy in isolated portions of the world in earlier millennia, are traced to provide a measure of the leeway encountered in the evolution of science.


332 Elements of Astrophysics Spring. 4 credits. Prerequisites: calculus and Physics 213. Physics 214 strongly recommended.

Lecs., M W F 11:15, P. J. Giersch.

An introduction to astronomy, with emphasis on the application of physical principles to a study of the universe. Physical laws of radiation. Distance, size, mass, and age of stars, galaxies, and the universe; stellar evolution and nucleosynthesis. Supernovae, pulsars, and black holes. Galaxies and quasars. Introduction to cosmology. Intended for students interested in astronomy, physics, and engineering.

431 Introduction to Astrophysics and Space Sciences I Fall. 4 credits. Prerequisites: mathematics above the 200 level and physics above the 300 level; concurrent registration in Physics 341 and 443 is helpful.


A systematic development of modern astrophysical concepts for physical science majors. Atomic and electromagnetic processes in space. Introduction to star formation, stellar structure, stellar systems, and the interstellar medium. At the level of Astrophysical Concepts, by Harwit.

432 Introduction to Astrophysics and Space Sciences II Spring. 4 credits. Prerequisite: Astronomy 431 or permission of instructor.

M W F 10:10 T. L. Heber.

Astrophysics is discussed in the context of cosmology. Cosmological subjects covered include the expansion of the universe, metrics, Friedmann equations, dark matter, cosmological tests, the early universe, formation of galaxies, and cosmological production of the elements. Astrophysical subjects drawn include special relativity, radiative transfer, electromagnetism, quantum mechanics, gravitational physics, and nuclear physics. At the level of Astrophysical Concepts, by Harwit.

[433 The Sun Spring. 4 credits. Not offered 1987-88]

434 The Evolution of Planets Spring. 4 credits.


An introduction to the physical and chemical processes that have been active in altering the environments of planets and satellites from their original to their present state. Theories of the formation of the solar system are revealed with special emphasis on chemical differentiation of the primitive nebula. A critical assessment is made of how well the various theories account for the clues left in the meteorite record and how well they explain the current environments of the
520 Radio Astronomy Fall 4 credits. Hours to be arranged. J. M. Cordes, M. P. Haynes. Radio Astronomy telescopes and electronics, and antenna theory; observing procedures and data analysis; concepts of interferometry and aperture synthesis.


523 Signal Processing in Astronomy Spring. 4 credits. Not offered 1987–88.]


560 Theory of Stellar Structure and Evolution (also Physics 667) Fall. 4 credits. M W F 1:25. E. E. Salpeter. Stellar evolution from main sequence stars; dimensional analysis; nuclear reactions and energy transport in stellar interiors; models for static and evolving stars. At the level of Principles of Stellar Evolution and Nucleosynthesis, by Clayton.

570 Physics of the Planets Fall 4 credits. Hours to be arranged. P.D. Nicholson. An introductory survery of planetary science with an emphasis on the application of physical principles. Recent observational results, including those of ground-based optical, infrared, radio, and radar astronomy, as well as those made by spacecraft, will also be discussed. Planetary dynamics, including satellite orbits, tidal interactions, and ring dynamics. An introduction to the theory of planetary interiors, gravitational and magnetic fields, heat sources, and chemical composition. Physics and chemistry of planetary atmospheres, radiative transfer, convection, thermal structure, and dynamics. Planetary magnetospheres. Intended for students in astronomy, physics, and engineering.

571 Mechanics of the Solar System (also Theoretical and Applied Mechanics 673) Fall. 3 credits. Prerequisites: undergraduate course in dynamics. Offered alternate years.


576 Solar Terrestrial Physics (also Electrical Engineering 586) Spring. 3 credits. Hours to be arranged. P. L. Gierasch, D. Farley. High-altitude ionosphere; electric fields in the polar cap and auroral zone; particle precipitation and the aurora; magnetic and ionospheric storms; plasma instabilities in the ionosphere and magnetosphere; structure and physical processes in the sun, solar corona and solar wind; interactions between the solar wind and the earth's magnetosphere; trapping, acceleration, and drift of energetic particles in the magnetosphere.

579 Celestial Mechanics (also Theoretical and Applied Mechanics 672) Spring. 3 credits. Not offered 1987–88. Two 1 1/2 hours lecs a week, hours to be arranged. J. Burns.


599 Cosmology Spring. 4 credits. Prerequisites: statistical physics, quantum mechanics, and electromagnetc theory. Knowledge of general relativity would be useful but is not essential. Hours to be arranged. J. M. Wasserman. This course is arranged by P. L. Gierasch, will be detailed theoretical development of current ideas in cosmology. Topics will include observational overview; growth of irregularities, galaxy formation and clustering; big bang cosmology, recombination, nucleosynthesis; very early universe, symmetry breaking, inflationary scenarios. At the level of Peebesses, Physical Cosmology and The Large Scale Structure of the Universe.


633 Seminar: Advances in Infrared Astronomy Fall. 2 credits. Hours to be arranged. M. O. Harwit and T. L. Herter. Most of the course will be devoted to results and interpretation of recent observations, including the findings of the Infrared Astronomical Satellite. Modern techniques and their limitations will be briefly discussed.

640 Advanced Study and Research Fall or spring. Credit to be arranged. Hours to be arranged. Staff. Guided reading and seminars on topics not currently covered in regular courses. Students need to register in the department office, 426 Space Sciences Building.


671 Seminar: Mars—Geology, Volatiles, and Climate Fall. 2 credits. Prerequisites: permission of instructor. Hours to be arranged. S. W. Squyres.
Geology, geochemistry, and climatology of Mars. Origin and evolution of surface features; evolution and current distribution of life. Behavior of H2O and CO2, evolution of the martian climate; investigation of Mars via remote sensing techniques such as gamma-ray, infrared reflectance, and thermal emission spectroscopy. Emphasis will be on scientific issues that will be addressed by the upcoming NASA Mars Observer mission. Attention will also be devoted to scientific strategies for a possible future Mars Rover/Sample Return mission.

671 Seminar: Space-based Astronomy and Space Sciences Spring. 2 credits.
Hours to be arranged. Newman. The capabilities of the U.S. space shuttle and space station in performing basic scientific research. Emphasis will be placed on solar system exploration and galactic and extragalactic astronomy from space.

672 Seminar: Special Topics Fall. 4 credits. Not offered 1987–88.


680 Seminar: Computational Astrophysics (also Physics 581) Spring. 3 credits. Prerequisites: working knowledge of Fortran. Only those students who have completed the fundamental graduate physics courses should consider attending.

110 Mathematical Methods in the Physical Sciences I
T R 10:11-10:30 5 A. Teukolsky. A course designed to familiarize graduate students with numerical techniques for solving diverse problems in astrophysics. Topics in hydrodynamics will be included as examples of nonlinear phenomena. Numerical methods discussed in the course will include solving ordinary and partial differential equations, linear algebra, and value problems. Monte Carlo techniques, fast Fourier transforms, etc. Students will be allotted computer time to solve, both individually and in small teams, assigned numerical exercises.


Biological Sciences
G. W. Sharp, director (200 Stimson Hall, 255-5042); H. T. Stimson, associate director and director of undergraduate studies (118 Stimson Hall, 255-5233); R. M. Sparrow, Biology Center coordinator (Biology Center, G20 Stimson Hall, 255-3358); M. L. Cox, executive staff assistant (118 Stimson Hall, 255-6859).

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

The program of study in biology at Cornell is offered by the Division of Biological Sciences to students enrolled in either the College of Agriculture and Life Sciences or the Division of Biological Sciences. Student services in the division's office for academic affairs and the College of Arts and Sciences may consult the Cornell Marine Programs General Biology. Students interested in the marine sciences may consult the Cornell Marine Programs Office (G14 Stimson Hall, 255-3717) for academic advice and career counseling. For more details about the biology curriculum see the section in this catalog in the College of Arts and Sciences (118 Arts and Sciences) and in the Division of Biological Sciences.

Burmese, Cambodian, and Cebuano (Bisayan)
See Modern Languages, Literatures, and Linguistics.

Chemistry

The chemistry department offers a full range of courses in physical, organic, inorganic, analytical, theoretical, biogeneric, and biophysical chemistry. In addition to teaching their teaching interests, chemistry faculty members have active research programs. The link between teaching and research is a vital one in a continuously evolving scientific subject. It ensures that students will be provided with the most advanced information and practices.

The Major
The chemistry major at Cornell is not an easy option: it requires conceptual skills in mathematics and logical thinking, practical and laboratory skills, and creativity in the design of experiments. In recent years chemistry majors have gone on to graduate study in chemistry, medicine, law, and business management, as well as directly into positions with chemical, pharmaceutical, and other industrial companies. A major in chemistry can provide the basis for significant work in related areas such as molecular biology, chemical physics, geochemistry, chemical engineering, and solid state physics. A major in chemistry permits considerable flexibility in the detailed planning of a course program. The required courses can be completed in three years, leaving the senior year open for advanced and independent work under the supervision of a professor.

The courses are arranged as a progression, with some courses (including mathematics and physics) prerequisite to those that are more advanced. During the first year, the student should normally register for general chemistry (preferably but not necessarily Chemistry 215), mathematics, a freshman writing seminar course, a foreign language if necessary, or in some instances, physics. Although Chemistry 215–216 is preferred, students may begin their programs with Chemistry 207–208. Chemistry 215–216 is limited to those students with good preparation and a strong interest in chemistry. Students who do not know if their preparation is adequate should consult the instructor. In the second year the student should complete calculus and take physics and organic chemistry. Chemistry 359–360 is preferred to Chemistry 357–358. The second-year laboratory courses include 300, Quantitative Chemistry. If needed, and 301, Experimental Chemistry I. 389–390, Physical Chemistry I, 412, 423, 461, or 477. In addition, superior performance on placement credit for Chemistry 207–208 and proceed to a more advanced program.

Prerequisites for admission to a major in chemistry are (1) Chemistry 215–216 or 207–208 plus 300, (2) Physics 207, and (3) Mathematics 111 or 191. Students are not encouraged to undertake a major in chemistry until they have passed those prerequisite courses at a good level of proficiency. Knowledge of simple computer programming is essential. This may be achieved either by self-study (a syllabus is available) or by taking courses such as Computer Science 100. The minimum additional courses that must be completed for a major in chemistry are listed below.

1) Chemistry 301, 302, 303, 359–360 (or, if necessary, 357–358 may be substituted), 389–390, and 410
2) Physics 207 plus 213; or 122 plus 221, 222, or 192 plus 293, 294
3) Physics 208

Potential majors electing to take mathematics 213 are strongly urged to do so in their sophomore year to avoid scheduling conflicts with Chemistry 389 in their junior year.

This sequence is a core program in chemistry. It is anticipated that students through elective courses, extend it substantially in whatever direction suits their own needs and interests. It is particularly important that those going on to graduate work in chemistry recognize the need for a good level of proficiency in mathematics, and such students are strongly urged to supplement their programs, where possible, with Chemistry 405, 410, 605, 606, 668, and 681 and German or Russian. Even students not planning graduate work in chemistry should consider advanced work in physics and mathematics, courses in the biological sciences, and advanced work in chemistry as possible extensions of the basic program.

Honors. The honors program in chemistry offers superior students an opportunity to study independently in semesters of regular academic year experience by engaging in research during the senior year. It is particularly recommended to those who plan graduate work in chemistry. Prospective candidates should complete the introductory organic chemistry and physical chemistry sequences by the end of the junior year. However, failure to have completed those courses in the junior year does not in itself disqualify a student from the honors program. Completion of the program at a high level of performance leads to the degree of Bachelor of Arts with honors in chemistry. Students will be admitted to the program by invitation of the department. Selection will be based on a superior cumulative average, including chemistry grades, and good performance in a prior research program. Prospective candidates should discuss their plans with advisors by March 1 of their junior year. Participants are notified early January. Students who are awarded honors, candidates must show outstanding performance in at least 8 credits of undergraduate research credit in any semester. Honors in Chemistry 412, 461, or 477. In addition, superior performance in the writing of a thesis, in the honors seminar (Chemistry 498) is expected.

Laboratory Course Regulations
Students registered for laboratory courses who do not arrive at the first meeting of the laboratory will forfeit their registration in that course.

Students and members of the teaching staff are required to wear safety goggles in all chemistry laboratories. Students are reminded to take their
Chemistry 253 or 357; or Chemistry 104 and 253 with a focus on quantitative aspects. Second term includes an intensive systematic study of the laws and concepts for non-chemistry majors. Enrollment limited.

An introduction to chemistry, with emphasis on the important principles and facts of inorganic and organic chemistry.

Elementary Organic Chemistry
Fall or summer. 2 credits. Recommended for non-chemistry majors. Prerequisite: Chemistry 251. Lec, M, B, lab, M T W R or F 1:25–4:25. Prelims: 8 a.m., March 7, April 18. D. A. Usher. A continuation of Chemistry 251.

Elementary Organic Chemistry
Fall or summer. 4 credits. Primarily for students in the premedical and biological curricula. Limited to 480 students. Prerequisite: Chemistry 104 with grade of C or better or Chemistry 208 or 216. Lec, M W F S 10:10–11, 11:15 or 12:20, lab, T or R 8–11, or F 10:10–1–11, or M, W or F 1:25–4:25. Prelims: 7:30–9 p.m., Oct. 6, Nov. 10, March 3, April 14. Fall: A. C. Albrecht; spring: B. Campbell.

An introduction to the techniques of qualitative analysis. Included are a brief introduction to the organic chemistry of biological systems.

Note: Because of duplication of material, students are not permitted to earn both 4 credits for Chemistry 253 and 3 credits for Chemistry 357. In special situations (consult instructor for details), students should take Chemistry 255 for 2 credits after having earned 3 credits for Chemistry 357. Prerequisite for Chemistry 357: place on the particular medical school they wish to enter. Students may earn 6 credits by taking Chemistry 251–253 or 8 credits by taking Chemistry 251–253–301 or 253, 251, and 252.

Elementary Organic Chemistry
Fall or summer. 2 credits. Same course as Chemistry 253, but to be taken for reduced credit by students already having 3 credits for Chemistry 251.

Elementary Physical Chemistry
Fall, spring. 2 credits. Corequisite: Chemistry 208 or 216 and Mathematics 111–112 or permission of instructor. Prerequisite for Chemistry 288: Mathematics 111–112 or permission of instructor. Lec, M W F S 10:10–11, 11:15 or 12:20, lab, T or R 8–11, or M, W or F 1:25–4:25. Prelims: 7:30–9 p.m., Sept. 29, Nov. 3, Dec. 1, Feb. 18, March 31, April 28. Fall: G. S. Ezra, B. Widom; spring: J. H. Freed. A systematic treatment of the fundamental principles of physical chemistry.

Introduction to Physical Chemistry Laboratory

Quantitative Chemistry
Fall or summer. 2 credits. Prerequisite: Chemistry 208 or advanced placement in chemistry. Lec, F, C 220, lab, M T W R 12:20–4:25 or R 8–12 or a split session (see schedule). Lab includes one-hour rec. Prelims: 12:20–p.m., Oct. 9, Nov. 20. G. H. Morrison. Gravimetric, volumetric, spectrophotometric, and potentiometric methods are emphasized. Lectures and problem sets stress the relationship between theory and applications.

Introduction to Experimental Organic Chemistry
Fall or summer. 2 credits. Recommended for non-chemistry majors. Enrollment limited. Prerequisite: Chemistry 208 and coregistration in Chemistry 253 or 257. Chemistry 104 and 253 with a grade of C or better. Students who have taken Chemistry 104 must complete Chemistry 253 before taking Chemistry 251.

Lec, M or F R (all students attend first lecture); lab, M T W R or F 1:25–4:25, or R or T R 8–11. Prelims: 7:30–9 p.m., Oct. 6, Nov. 12. D. Collum. Introduction to synthesis and the separation and handling of materials, including applications of many types of chromatography, simple and fractional distillation, crystallization, extraction, and others.

Experimental Organic Chemistry

Experimental Organic Chemistry
Fall or summer. 4 credits. Prerequisite: Chemistry 216 or 300, and 253 or 357 or 359. Concurrent registration in Chemistry 253 is not recommended.


Experimental Chemistry II
Fall. 4 credits. Enrollment limited; preference given to chemistry majors. Prerequisite: Chemistry 301.


Experimental Chemistry III
Spring. 4 credits. Each lab limited to 24 students. Prerequisites: Chemistry 302, 389, 390, coregistration in the latter is permissible.


Introductory Organic Chemistry
Fall, spring. 3 credits each term. Prerequisite for Chemistry 357: Chemistry 208 or 216 or advanced placement, recommended: concurrent registration in Chemistry 251. Prerequisite for Chemistry 358: Chemistry 357; recommended: concurrent registration in Chemistry 301.


Note: Because of duplication of material, students are not permitted to earn both 4 credits for Chemistry 253 and 3 credits for Chemistry 357. In special situations (consult instructor for details), students should take Chemistry 255 for 2 credits after having earned 3 credits for Chemistry 357. Students will not be permitted to take Chemistry 358 after completing Chemistry 253.

Organic Chemistry I and II
Fall, spring. 4 credits each term. Recommended for students who intend to specialize in chemistry or in closely related fields. Enrollment limited. Prerequisites: Chemistry 216 with a grade of B or better, Chemistry 208 with a grade of A or better, or permission of instructor. Prerequisite for Chemistry 360. Chem 359. Recommended: coregistration in Chemistry 300–301–302.

Lec, M, W, F 9:05; laboratory, M, W, F 7:30–9 p.m. Prelims: 9:05 a.m., Sept. 23, Oct. 23, Nov. 23, Feb. 19, March 18, April 13, April 22. Fall: T. P. Begley; spring: J. M. J. Fréchet. A rigorous and systematic study of organic and organometallic compounds, their structures, the mechanisms of their reactions, and the ways in which they are synthesized in nature and in the laboratory.
The principles of physical chemistry are studied from the standpoint of the laws of thermodynamics, kinetic theory, and quantum chemistry.

405 Techniques of Modern Synthetic Chemistry Spring. 4 credits. Enrollment limited. Prerequisite: Chemistry 302 and permission of instructor. Selection of students will be based on grades in Chemistry 301 and 302. With permission of the instructor, graduate students may participate in one or two-week experiments on a prearranged schedule. Lab time required: 16 hours each week, including at least two 4-hour sessions in 2 sections (M W 1:25 or T R 1:25). First meeting will be at 4:30 on first class day of semester. Lab first week only, at times to be arranged: J. M. Burlish.
The synthesis of complex organic, organometallic, and inorganic molecules are carried out with emphasis on the following techniques: vacuum line, high pressure, high-temperature solid state, inert atmosphere, nonaqueous solvents, radioactive labeling, photochemical and electrochemical methods, solid phase peptide synthesis, and polymer synthesis. Elementary glassblowing.

410 Inorganic Chemistry Spring. 4 credits. Prerequisites: Chemistry 302, 390, and 389; Lecs, M W F 11:15. R. C. Fay.
A systematic study of the synthesis, structure, and reactivity of inorganic and organometallic compounds.

421 Introduction to Inorganic Research Fall or Spring. 2-4 credits. Prerequisites: Chemistry 303 and 389-390, or Chemistry 287-288, and Chemistry 289-290 with an average of B- or better, or permission of instructor.
Selected faculty.
Research in inorganic chemistry involving both laboratory and library work, planned in consultation with a faculty member.

433 Introduction to Analytical Research Fall or Spring. 2-4 credits. Prerequisites: Chemistry 303 and 389-390, or Chemistry 287-288, and Chemistry 289-290 with an average of B- or better or permission of instructor.
Selected faculty.
Research in analytical chemistry involving both laboratory and library work, planned in consultation with a faculty member.

461 Introduction to Organic Research Fall or Spring. 2-4 credits. Prerequisites: Chemistry 302 and 358 or 360 with a grade of B- or better or permission of instructor.
Selected faculty.
Research in organic chemistry involving both laboratory and library work, planned in consultation with a faculty member.

477 Introduction to Research in Physical Chemistry Fall or Spring. 2-4 credits. Prerequisites: Chemistry 390 with an average of B- or better or permission of instructor.
Selected faculty.
Research in physical chemistry involving both laboratory and library work, planned in consultation with a faculty member.

498 Honors Seminar Spring. No credit. Admission by departmental invitation. Additional prerequisites or corequisites: outstanding performance in either (1) two coherent 4-credit uniform courses in the same subject: Spring, 6 credits; or (2) one 4-credit unit in a course such as Chemistry 421, 433, 465, or 477; or (2) a 4-credit unit in a course such as Chemistry 421, 433, 461, or 477 and summer research equivalent to at least 4 credits in the same subject: W 390-391. L. A. Philips.
Informal presentations and discussions of selected topics in which all students participate. Individual research on unsolved problems in chemistry or a related subject under the guidance of a faculty member, culminating in a written report.

600-601 General Chemistry Colloquium 600, fall; 601, spring. No credit. Required of all graduate students except those majoring in organic or bioorganic chemistry. Juniors and seniors are encouraged to attend.
A series of talks representative of all fields of current research interest in chemistry other than organic chemistry, given by distinguished visitors and faculty members.

605 Advanced Inorganic Chemistry I: Symmetry and Structure Fall. 4 credits. Prerequisite: Chemistry 389-390 or an equivalent and permission of instructor.
The first of a three-term sequence. Group theory applications: hybrid orbitals, molecular orbitals, molecular vibrations, and ligand field theory, at the level of Cotton's Chemical Applications of Group Theory. Selected topics in structure, bonding, and reactivity of inorganic compounds at the level of Chemistry of the Elements, by Greenwood and Earnshaw.

606 Advanced Inorganic Chemistry II: Synthesis, Structure, and Reactivity of Inorganic and Organotransition Metal Compounds Fall. 4 credits. Prerequisite: Chemistry 389-390 or an equivalent and permission of instructor.
Lecs, M W F 9:05. F. J. DiSalvo.

622 Chemical Communication (also Biological Sciences 623) Fall. 3 credits. Limited to 30 students. Prerequisites: Chemistry 358, Biological Sciences 102, and Biochemistry 231. Intended primarily for research-oriented students. Offered alternate years.
The production, transmission, and reception of chemical signals in communicative interactions of animals, plants, and microorganisms. Communication involving insects is emphasized. Specific topics are treated, with varying emphasis on chemical, biochemical, neurobiological, ecological, and evolutionary principles.

625 Advanced Analytical Chemistry I Fall. 4 credits. Prerequisite: Chemistry 288 or 390 or equivalent.
Lecs, M W F 8; exams, T 7:30 p.m. P. Lazic, F. W. McLaflerty.
The application of molecular spectroscopy to chemical problems. Topics in infrared, NMR, Raman, and mass spectroscopy are discussed.

627 Advanced Analytical Chemistry II Spring. 3 credits. Primarily for graduate students. Prerequisite: Chemistry 288 or 390 or equivalent. Not offered 1987-88.
Lecs, T R 10:10. problem sessions and exams, T 7:30 p.m. F. W. McLaflerty.
Modern analytical methods, including electron, Mossbauer, and Fourier spectroscopy; mass spectrometry; methods applicable to macromolecules; information theory.

628 Advanced Analytical Chemistry III Spring. 3 credits. Primarily for graduate students. Prerequisite: Chemistry 288 or 390 or equivalent. Not offered 1987-88.

650-651 Organic and Organometallic Chemistry Seminar 650, fall; 651, spring. No credit. Required of all graduate students majoring in organic or bioorganic chemistry. Juniors and seniors are encouraged to attend.
Fundamentals and applications of electrochemistry. Topics will include the fundamentals of electrode kinetics, electron transfer theory, the electrical double layer, and diffusion. A wide range of techniques and their application as well as instrumental aspects will be covered.

665 Advanced Organic Chemistry Fall. 4 credits. Primarily for graduate students and upperclass undergraduates. Prerequisites: Chemistry 253 or 358, 360, and 390 or equivalents or permission of instructor.
A survey of reaction mechanisms and reactive intermediates in organic chemistry. Applications of qualitative molecular orbital theory are emphasized.

666 Synthetic Organic Chemistry Spring. 4 credits. Primarily for graduate students and upperclass undergraduates. Prerequisites: Chemistry 665 or permission of instructor.
Modern techniques of synthesis, applications of organic reaction mechanisms to the problems encountered in rational multistep synthesis, with particular emphasis on modern developments in synthetic design.

686 Chemical Aspects of Biological Processes Fall. 4 credits. Prerequisites. Chemistry 358 or 360, and 390 or 288 or equivalents. Not offered 1987-88.
Lecs, M W F 10:10.
Biochemical systems, bioenergetics, enzymes, metabolic pathways, chemical evolution. This course forms the chemical basis for the graduate program in molecular biology.

672 Enzyme Catalysis and Regulation Spring. 4 credits. Primarily for graduate students in chemistry and biochemistry. Prerequisites: Chemistry 358 or 360, and 390 or equivalents, and a course in general biochemistry.
Lecs, M W F 9:05 and occasionally 7:70 p.m. B. A. Baird.
Protein structure and dynamics; steady-state and transient kinetics; binding isotherms; chemical modification enzymes; application of NMR, EPR, and fluorescence; acid-base catalysis; allosterism; discussion of specific enzymes to illustrate general principles.

677 Chemistry of Nucleic Acids Fall. 4 credits. Primarily for graduate students. Prerequisites: Chemistry 358 or 360, and 390 or equivalents.
Lecs, M W F 9:05 and occasionally 7:70 p.m. B. A. Baird.
Protein structure and dynamics; steady-state and transient kinetics; binding isotherms; chemical modification enzymes; application of NMR, EPR, and fluorescence; acid-base catalysis; allosterism; discussion of specific enzymes to illustrate general principles.

678 Thermodynamics Spring. 4 credits. Primarily for graduate students. Prerequisite: Chemistry 288 or 390 or equivalents.
Principles of equilibrium thermodynamics. Thermodynamic functions; First and Second Laws; gases and condensed phases; solutions; phase equilibrium; chemical equilibrium; surface thermodynamics; electrolytes; statistical thermodynamics and the Third Law.

681 Physical Chemistry III Fall: 4 credits. Prerequisites: Chemistry 288 or 390, Mathematics 213 and Physics 208, or equivalents.
An introduction to the principles of quantum theory and statistical mechanics, atomic and molecular spectra, and elementary valence theory. At the level of Quantum Chemistry, by Levine.

686 Physical Chemistry of Proteins Spring. 4 credits. Primarily for graduate students.
Prerequisites: Chemistry 288 or 390 or equivalents. Offered alternate years. Not offered 1987–88.
Lecs, MWF 10:10 and occasionally W 7:30 p.m. R. F. Porter.
[An introduction to the principles of quantum theory and statistical mechanics, atomic and molecular spectra, and elementary valence theory. At the level of Quantum Chemistry, by Levine.]

700 Baker Lectures Spring. On dates to be announced. No credit.
Distinguished scientists who have made significant contributions to chemistry present lectures for periods varying from a few weeks to a full term. This year’s lecturer: Richard H. Holm, Harvard University.

701–702 Introductory Graduate Seminar in Analytical, Inorganic, and Physical Chemistry 701; fall: 702, spring. No credit. Required of all first-year graduate students majoring in analytical, inorganic, physical, theoretical, and biophysical chemistry.

716 Selected Topics in Advanced Inorganic Chemistry Fall. 3 credits. Prerequisite: Chemistry 390 or equivalent. Not offered 1987–88.

765 Physical Organic Chemistry I Spring. 4 credits. Primarily for graduate students.
Prerequisite: Chemistry 665 or permission of instructor.
Continues and extends the approach of Chemistry 665 to more complicated organic reactions. Emphasis is on applications of reaction kinetics and isotope effects to gain an understanding of reaction mechanisms.

766 Physical Organic Chemistry II Spring. 3 credits. Primarily for graduate students.
Prerequisite: Chemistry 765 or permission of instructor. Not offered 1987–88.
Quantiative aspects of organic chemistry.

774 Chemistry of Natural Products Fall. 3 credits. Primarily for graduate students.
Particular attention is devoted to methods of structure determination and synthesis as applied to selected terpenoids, steroids, alkaloids, and antibiotics.

780 Principles of Chemical Kinetics Spring. 4 credits. Prerequisite: Chemistry 681 or permission of instructor.
Lecs. MWF 11:15. B. W. Widom.
Principles and theories of chemical kinetics; special topics such as activation energy, collision theory, reaction mechanisms, energy transfer, and molecular beams.

Lecs. T R 11:15.
Topics vary from year to year.

789 X-Ray Crystallography Spring; offered only when sufficient registration warrants. 4 credits. Prerequisite: Chemistry 288 or 390 or permission of instructor.
MWF 11:15. C. J. Clardy.
A beginning course in the application of X-ray crystallography to structural chemistry. Topics include symmetry properties of crystals, diffraction of X rays by crystals, interpretation of diffraction data, and refinement of structures. The chemical information available from a diffraction experiment is stressed, and theoretical aspects are illustrated by conducting an actual structure determination as a classroom exercise. At the level of Allen and C. E. Johnson's Structure Determination by X-Ray Crystallography.

791 Spectroscopy Fall. 4 credits. Prerequisites: Chemistry 750 or equivalent; 443 or equivalent.
Lecs. MWF 10:10. A. C. Albrecht.
Principles of linear and nonlinear atomic and molecular optical spectroscopies. Light-matter interaction, including relaxation phenomena, will be examined within the density matrix formalism. Topics drawn from the current literature will be concerned with coherence and incoherence, high light intensities, and ultrashort light pulses.

Hours to be arranged. G. S. Ezra.
The concepts and methods of scattering theory are described with particular emphasis on applications to problems of chemical interest. At the level of Child’s Molecular Collision Theory and Taylor's Scattering Theory.

793 Quantum Mechanics I Fall. 4 credits. Prerequisites: Chemistry 681, coregistration in Mathematics 421, and Physics 431 or equivalents or permission of instructor.
Lecs. MWF 11:15. J. H. Freed.
Schrödinger’s equation, wave packets, uncertainty principle, WKBJ approximation. Group theory and applications in molecular spectroscopy and electronic structure of atoms and molecules. At the level of Bohm’s Quantum Theory.

794 Quantum Mechanics II Spring. 4 credits. Prerequisites: Chemistry 793 or equivalent and coregistration in Physics 432 and Mathematics 422, or permission of instructor.
Lecs. MWF 9:05. G. S. Ezra.
Time-dependent phenomena in quantum mechanics and the interaction with radiation. Group theory and applications in molecular spectroscopy and electronic structure of atoms and molecules. At the level of Weissbluth’s Atoms and Molecules and Sakurai’s Modern Quantum Mechanics.

796 Statistical Mechanics Spring. 4 credits. Primarily for graduate students.
Prerequisite: Chemistry 793 or equivalent.
Lecs, T R 8:30–9:55. R. Loring.
Microstates, ensembles, partition functions, and phase-space averaging. Thermodynamic functions and equations of state. Chemical equilibria. Scattering probes, correlation functions, and fluctuation quantum statistical mechanics, Fermi-Dirac and Bose-Einstein distributions; Bose-Einstein condensation. Ideal crystals. Virial expansion; simulation methods; metallic and insulating liquids; phase transitions; density matrix, response methods, and transport; lattice gases and spin systems; ising model and critical exponents; melting, freezing, and the wetting of interfaces. At the level of Ladd and Palmer's An Introduction to Quantum Statistical Mechanics and Spohn's Statistical Mechanics, by Pathria, and Statistical Mechanics, by McQuarrie.

798 Selected Topics in Physical Chemistry Spring. 3 credits. Prerequisite: Chemistry 793 or equivalent.
Topics vary. In spring 1988 the topic will be “From Bonds to Bonds: Chemical Bonding in Polymers, on Surfaces, and in the Solid State.” The qualitative aspects of the electronic structure and chemical bonding in extended one-, two-, and three-dimensional systems will be discussed. Elementary quantum mechanical models, the range of Chemistry 681 (or 793) will be used, but the course is intended to be accessible to a wide range of inorganic and organic as well as physical chemists and to engineers and physicists as well. The relevant elements of solid-state physics will be taught. There will be an emphasis on analogies to discrete molecules, on choices among alternative geometries, on chemisorption, and on delocalization and conductivity.

Chinese
See Department of Asian Studies, and Modern Languages, Literatures, and Linguistics.

Classics
Dr. Kenneth Dover, A. D. White Professor-at-Large; G. E. M. de Ste. Croix, Townsend Lecturer
Cornell University has long recognized the importance of studying the civilizations of ancient Greece and Rome. Especially in an age of increasing specialization, study of the Classics is widely viewed as an excellent means of acquiring a liberal education; at Cornell, we are deeply interested in the continuing humanistic values contained in the literature of the ancient world and in gaining a fuller understanding of these important cultures and their imprint upon subsequent ages.
The Department of Classics at Cornell is one of the oldest and largest in the country. With sixteen faculty members, together with professors of related interests in the Departments of History, Philosophy, Comparative Literature, History of Art, Architecture, Modern Languages and Linguistics, and Near Eastern Studies and in the Archaeology and Medieval Studies Program, the range of opportunities for study is very large, including not only the traditional study of language, literature, and ancient history, but also newer developments in the field, such as comparative study of Mediterranean civilizations and modern literary theory. Although Classics, like other areas of humanistic study, does not aim at providing specific preprofessional training, over the years Classics majors from Cornell have gone on to a wide variety of careers: in law, teaching, medicine, archaeology, diplomacy, management, educational administration, government, and many others.
The department offers courses in Bronze Age and Classical archaeology and is active in field archaeology in Classical lands. It recently sponsored an archaeological excavation at Alambra, in Cyprus, which served as a field training school for Cornell undergraduate and graduate students, and plans are under way for further excavation projects. On campus there are also collections of ancient artifacts, reproductions of ancient sculptures, and one of the few laboratories in the world that concentrate on the tree-ringing dating of ancient monuments from Greece, Cyprus, and Turkey. The archaeology courses may be used to satisfy some of the requirements for the intercollegiate program in archaeology or for the major in Classical civilization. They require no knowledge of either Greek or Latin. Similarly, the department offers a variety of courses and seminars in English on such subjects as Greek mythology, Greek and Roman
mystery religions, early Christianity, and Roman law, as well as ancient epic, tragedy, history, and philosophy. For those whose interest in things Greek and Roman extends no further than a desire to understand English, the department offers a course in the Greek and Latin elements that make up well over half of modern English vocabulary, and programs in Latin and Greek at the elementary level; another course deals with Greek and Latin elements in theo-bioscientific vocabulary. For the more ambitious there are courses involving the reading, in the original, of Greek and Latin authors from Homer to St. Augustine and Bede and, periodically, the Latin works of Dante, Petrarch, and Milton. The department makes every attempt to adapt its program to the needs of each student. If there is a Classical writer you would like to study, the department will do its best to help you do so whether you are a major in the department or not.

**Majors**

The Department of Classics offers majors in Classics, Greek, Latin, and Classical civilization.

**Classics**

Those who major in Classics must complete 24 credits in advanced courses in Greek or Latin (courses numbered 201 or above) and 15 credits in related subjects selected after a conference with the advisor.

**Classical Civilization**

Those who major in Classical civilization must complete (a) 24 credits selected from the courses listed under Classical civilization, Classical archaeology, Latin, and Greek, and (c) 15 credits in related subjects (courses offered in the humanities selected in conference with the advisor).

**Greek**

Those who major in Greek must complete 24 credits of advanced courses in Greek and 15 credits in related subjects (including Latin). One or more courses offered by the Department of Comparative Literature may be counted towards the required 24 credits of Greek if the student obtains the prior approval of the major advisor.

**Latin**

Requirements for the major in Latin parallel those of the major in Greek.

**Honors**

Candidates for the degree of Bachelor of Arts with honors in Greek, Latin, or Classical civilization must fulfill the requirements of the appropriate major study as given above and must also complete successfully the special honors courses 370, 471, and 472. Credit for honors courses may be included in the credits required for the major study. Students who wish to become candidates for honors, who have a cumulative average of B+ or better, and who have demonstrated superior performance in Classical courses (Greek, Latin, and Classical civilization), submit an outline of their proposed honors work to the honors committee during the first month of their senior year. The chairperson will appoint a committee of three faculty members for each candidate, and the committee will be responsible for evaluating the proposal of the candidate and subsequently supervising his or her work. At the completion of the honors thesis, which must demonstrate knowledge of the main bibliographical sources, give promise of scholarly talents, and show a creative mind, the committee will determine the level of graduation.

**Study Abroad**

Cornell participates in the Intercolligiate Center for Classical Studies in Rome, which offers courses in Latin, Greek, ancient history, art, archaeology, and Italian. Cornell is a member institution of the American School of Classical Studies at Athens, whose Summer Program is open to graduates and qualified undergraduates. The American Academy in Rome, of which Cornell is also a member institution, offers regular and summer programs for qualified graduate students. For both undergraduate and graduate students the Department of Classics offers a few travel grants each year from the Townsend Memorial Fund. Detailed information on these programs is available in the Department of Classics Office, 120 Goldwin Smith Hall.

**Summer Support for Language Study**

A number of fellowships are normally available to students who want to enroll in intensive Latin or Greek in the Cornell summer session. These six-week courses are designed to enable students to immediately enter second-year Latin or Greek the following fall. Applications are due to the chairman of the Department of Classics by May 1.

**Placement in Latin**

Placement of first-year students in Latin courses is determined by an examination given by the Department of Classics during orientation week or, if necessary, in the second half of the fall term.

**Classical Civilization**

100 **Word Power: Greek and Latin Elements in the English Language.** Fall or summer. 3 credits.

This course gives the student no knowledge of Classical languages but an understanding of how the Greek and Latin elements, which make up over half our English vocabulary, operate in both literary and scientific English usage. Attention is paid to how words acquire their meaning and to enlarging each student's working knowledge of vocabulary and grammar.

102 **Word Power for the Biological Sciences.** Spring or summer. 3 credits.

This course teaches the Greek and Latin word elements that combine to form most of the specialized terms in the biological sciences. The student who learns the meanings of these elements and the rules of word formation will usually recognize the basic meaning of any unfamiliar word in this field. Attention will also be paid to misformations, common errors, and words still in use that reflect scientific theories since rejected.

120 **Freshman Writing Seminar in Latin Literature.** Fall. 3 credits.

In this course we will study two ancient Roman novels, Petronius' *Satyricon* and Apuleius' *Metamorphoses*. Our particular focus will be on the place of these works between their ancient Greek predecessors and the continuing tradition of the novel in medieval Latin and English literature. Students will be taught to read carefully (and with enjoyment) and to express their thoughts clearly and effectively in writing.

121 **Freshman Writing Seminar in Classical Archaeology.** Fall or spring. 3 credits.

Archaeological research illuminates both the great achievements and the daily lives of the ancient Greeks and Romans. This course considers the methods, history, and results of archaeological research through the examination of a number of specific topics, which vary somewhat from year to year. Such topics may include Minoan and Mycenaean civilizations, archaeology and Homer, Greek and Roman architecture, sculpture and painting, and burial practices in various periods.

150 **Freshman Writing Seminar in Greek and Roman Myths.** Fall or spring. 3 credits.

An introductory course on the myths of Greece and Rome. Various sections will offer different views of the myths as they appear in ancient literature and art. All the sections should serve as a foundation for those interested in pursuing various theories as well as for those seeking to improve their grasp of mythical motifs in later European and American literature.

**211 The Greek Experience.** Fall. 3 credits. Not offered 1987-88.

MWF 2:30. M. Cook.

An introduction to the literature and thought of ancient Greece. Topics will include epic and lyric poetry, tragedy and comedy, and historical, political, philosophical, and scientific writings. Some attention will also be given to the daily life of ordinary citizens, supplemented by slides of ancient art and architecture.

**212 The Roman Experience.** Spring. 3 credits.


An introduction to the civilization of the Romans as expressed in their literature, art, and social and political institutions. This course will examine not only the intellectual life of the Romans but what it meant for men and women of all social classes to live in the Roman world. Selected readings in translation of works of literature, history, and philosophy, supplemented by slides and other visual materials.

**217 Initiation to Greek Culture.** Fall. 4 credits.

This course, and 218 in the spring (see below), is intended especially for freshmen: a few exceptionally motivated sophomores or upperclassmen may also be accepted. Apply in writing to the Chairman, Department of Classics, 120 Goldwin Smith Hall. Limited to 18 students.

MWF 11:15, plus one hour to be arranged. P. Pucci, H. Elsom.

Knowledge of Greek or Latin is not necessary, since all texts are in translation. What is necessary is the willingness to participate in three one-hour seminars each week and also a supplementary one-hour (occasionally two-hour) session, during which the class will audit and discuss Greek or Latin plays (on videotape), produce readings of works like Platonic dialogues, tragedies, comedies, satire, and courtroom speeches; visit museums; and participate in workshops with specially invited guests. This year, Initiation to Greek Culture will focus on Euripides and the age of Greek Enlightenment. This involves critical analysis of the plays, following the long path from Aristotle's Poetics, to Nietzsche's enthusiastic reading of Greek tragedy, to Dodd's disturbing appreciation of Euripides; "the irrationalist." The course will also survey modern productions of Euripides in theater and film, compare the plays with the other Greek sources and with the artistic representations on vase painting, and visit museums where these vases are preserved.

**218 Initiation to Roman Culture.** Spring. 4 credits.

MWF 11:15, plus one hour to be arranged. C. Newlands, J. Romm.

See the description of 217 above. Topics to be announced.

**222 The Individual and Society in Classical Athens.** Spring. 3 credits. Prerequisite: Classics 211 or 220 or History 161 or 265 or 266 or permission of instructor. Not offered 1987-88.

From Classical Athens (fifth and fourth centuries B.C.) come some of the most outstanding achievements in Western civilization: in literature, art, philosophy, historical writing, and the sciences. This course will survey Athenian daily life and discuss Athenian society with a view to isolating aspects that facilitated the development of the individual and individual achievement. Topics will include family life, education, economics, government, material culture, religion, and social structure. Political and military issues, while not totally disregarded, will not be of primary concern.

**224 Greek Philosophy.** Fall. 3 credits. Not offered 1987-88.

An introduction to the pre-Socratic philosophers and Plato.

235 Modern Greek Poetry and Politics (also Comparative Literature 235 and Government 335) Fall. 3 credits. T R 1:25–2:40. G. Holst-Warhaft. The history of modern Greek poetry has been marked by series of political crises that have resulted in deep divisions in society. Greek poetry has reflected these crises and divisions, and in this course the poetry of nineteenth- and twentieth-century Greece will be interpreted in its historical and political context. The course will concentrate on four periods in which there has been a particularly strong interaction. The continuity found in Greek myths in modern Greek poetry will also be explored. Students taking this course as Government 335 for 4 credits must write an additional paper on a political topic.

236 Greek Mythology (also Comparative Literature 236) Fall. 3 credits. T R 8:40–9:55. F. Ahl. An introduction to major myths of Greece and Rome as they appear in works of art, plays, poems, and (where necessary) scholarly literature from antiquity to the present day. Approximately two-thirds of the course will center on major authors such as the Greek tragedians, Plato, Vergil, Ovid, Plutarch, Seneca, Statius, and Apuleius. The remainder will examine the ways in which selected Greek and Roman myths are presented in medieval, Renaissance, and more-recent times by such writers and artists as Chaucer, Shakespeare, Racine, Delacroix, Poussin, Joyce, Kazantzakis, and Borges.

237 Greek and Roman Mystery Religions Spring. 3 credits. Not offered 1987–88. T R 12:20–1:35. K. Clinton. The development and character of Mystery cults from the original Mysteries of Demeter and Persephone to the Christian Mysteries. The cults include the Kabiroi, the Great Gods of Samothrace, Dionysus, Osiris, and other cults of Asia Minor and the Near East. Investigation will focus on the distinctive features of the Mystery cults that contributed to their success.

238 The Ancient Epic Fall. 3 credits. Not offered 1987–88. M W F 10:10. K. Clinton. A close reading of the Homeric epics and Vergil's Aeneid. The Iliad and the Odyssey will be considered as oral poetry and in terms of their place in a traditional society but with reference to modern interpretations. The Aeneid will be read as a major rewriting of Homer designed for a new audience.

245 Greek and Roman Historians Spring. 3 credits. Not offered 1987–88. T R 2:30–3:45. J. Ginsburg. Study of historical writing in antiquity through selected readings in translation from the Greco-Roman historians. Among topics to be examined are the historian's task as understood by the ancients; the method, narrative technique, and accuracy of the Greek and Roman historians, and their attitudes toward the events that they relate.

300 Greek and Roman Drama: Greek Tragedy (also Comparative Literature 300) Spring. 4 credits. M W F 2:30. J. Romm. The tragedies of Aeschylus, Sophocles, and Euripides, read in translation. This emphasis will be on the form of the dramas and on their meaning in the fifth century B.C. and today.

333 Latin Foundations of Western Literature (also Comparative Literature 333) Spring. 4 credits. Not offered 1987–88. M W F 2:30–3:45. L. Abel. J. Ginsburg. In this course students will examine the evidence about the social and political position of women in ancient Greece and Rome and consider the images of women in Classical literature. The purpose will be to trace the origins of some Western attitudes about women and to address general historical questions about evidence and problems in using literature and historical writing to assess social roles.

465–466 Independent Study in Classical Civilization, Undergraduate Level 465, fall; 466, spring. Up to 4 credits. Hours to be arranged. Staff.


681 Patristic Seminar: Graduate Fall or spring. 4 credits. Not offered 1987–88.

711–712 Independent Study for Graduate Students in Classical Civilization 711, fall; 712, spring. Up to 4 credits. Hours to be arranged. Staff.

Greek

101 Greek for Beginners Fall or summer. 4 credits. Fall: M W T F 12:20. M. Cook. Introduction to Attic Greek. Designed to enable the student to read the ancient authors as soon as possible.


204 Plato Spring. 3 credits. Prerequisite: Classics 103 or 104 or equivalent. T R 8:40–9:55. P. Pucci. Readings in the Homeric epic with emphasis on formulaic style.

205 Plato Spring. 3 credits. Prerequisite: Classics 103 or 104 or equivalent. T R 11:40–12:55. Staff.

210 Greek Composition Spring. 3 credits. Prerequisite: Classics 203 or 204 or equivalent. T R 11:40–12:55. Staff.

301 Greek Historians Fall. 4 credits. Prerequisite: Classics 203 or 204 or equivalent. Not offered 1987–88. M W F 1:25. M. Cook. Topic varies. Most recently the course consisted of reading in (Greek) and study of selected passages from Herodotus.

302 Greek Tragedy Fall. 4 credits. Prerequisite: Classics 203 or equivalent. Not offered 1987–88. T R 10:10–11:25. P. Pucci. During this course we will study one play of Sophocles and two of Euripides. We will analyze the typical forms and conventions of tragic language and the specific styles of Sophocles and Euripides.

303 Readings in Greek Rhetoric Fall. 4 credits. Not offered 1987–88. M W F 9:05. P. Mitssis. An examination of the development of Greek rhetorical theory and practice from Antiphon to Dinarchus. Consideration will be given not only to the methods and techniques of Attic oratory but also to its legal and political context. These texts will also be studied as important sources for the Greeks' views on such ethical questions as the nature of responsibility, moral obligations between citizens, and the morality of war.
### Latin

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisite</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>105</td>
<td>Latin for Beginners</td>
<td>4</td>
<td>Fall or summer</td>
<td>MTWF 10:10; J. Romm; MTWF 1:25 or 2:30; I. Hohendahl. Introductory course in the essentials of Latin, designed for rapid progress toward reading the principal Latin writers.</td>
</tr>
<tr>
<td>106</td>
<td>Elementary Latin</td>
<td>4</td>
<td>Spring or summer</td>
<td>MTWF 9:05; P. Mitsis; MTWF 11:15 or 1:25; I. Hohendahl. A continuation of Classics 105, using readings from various authors.</td>
</tr>
<tr>
<td>205</td>
<td>Intermediate Latin</td>
<td>3</td>
<td>Fall</td>
<td>Classics 106, 107, or 108 or placement by departmental examination. MTWF 10:10; J. Ginsburg; MTWF 1:25; H. Elsom.</td>
</tr>
<tr>
<td>207</td>
<td>Catullus</td>
<td>3</td>
<td>Spring</td>
<td>Classics 106, 107, or 108 or one term of 200-level Latin. Not offered 1987-88.</td>
</tr>
<tr>
<td>208</td>
<td>Roman Drama</td>
<td>3</td>
<td>Spring</td>
<td>Classics 106, 107, or 108 or one term of 200-level Latin. Not offered 1987-88.</td>
</tr>
<tr>
<td>242</td>
<td>Latin Composition</td>
<td>3</td>
<td>Spring</td>
<td>Classics 241 or equivalent. Not offered 1987-88.</td>
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<tr>
<td>312</td>
<td>Latin Undergraduate Seminar</td>
<td>4</td>
<td>Fall or spring</td>
<td>Classics 209-210 or equivalent. Not offered 1987-88.</td>
</tr>
<tr>
<td>318</td>
<td>Roman Satire</td>
<td>4</td>
<td>Spring</td>
<td>Classics 209-210 or equivalent. Not offered 1987-88.</td>
</tr>
<tr>
<td>319</td>
<td>Roman Philosophical Writers</td>
<td>4</td>
<td>Fall</td>
<td>Classics 209-210 or equivalent. Not offered 1987-88.</td>
</tr>
<tr>
<td>317</td>
<td>Roman Historiography</td>
<td>4</td>
<td>Fall</td>
<td>Classics 209-210 or equivalent. Not offered 1987-88.</td>
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<tr>
<td>318</td>
<td>Roman Elegy: Tibullus, Propertius, Ovid</td>
<td>4</td>
<td>Spring</td>
<td>Classics 209-210 or equivalent. Not offered 1987-88.</td>
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<tr>
<td>319</td>
<td>Roman Historiography</td>
<td>4</td>
<td>Fall</td>
<td>Classics 209-210 or equivalent. Not offered 1987-88.</td>
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### Classical Archaeology

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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisite</th>
<th>Schedule</th>
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<tbody>
<tr>
<td>219</td>
<td>Mediterranean Archaeology</td>
<td>3</td>
<td>Fall</td>
<td>MTWF 10:10-11:25; F. Ahl. Selections from Ovid, Lucan, Statius, Silius, and Prudentius to illustrate the development and refinement of Latin epic during the Roman Empire.</td>
</tr>
<tr>
<td>220</td>
<td>Introduction to Classical Archaeology</td>
<td>3</td>
<td>Spring</td>
<td>MTWF 10:10-11:25; J. Cook. The archaeology of the ancient Greeks and Romans as seen from a critical perspective. Major developments in Classical archaeology will be traced from treasure hunting to modern scientific research. Examples illustrating various approaches will be chosen: the sculpture, vase painting, and architecture of the Mediterranean Bronze Age.</td>
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</table>
ancient Greeks from the Geometric period through the Hellenistic, and the art of the Romans from the early republic to the late empire.

221 Minoan-Mycenaean Art and Archaeology (also Archaeology 221) Fall. 3 credits. Students may only obtain credit for both this course and Classics 319.


The birth of civilization in Greece and the Aegean islands during the Bronze Age. The main focus is on the rise and fall of Minoan Crete and Mycenaean Greece, with consideration given to the nature and significance of Aegean interactions with Egypt, the Near East, and Anatolia.

[233 Archaeology in Action II (also Archaeology 233) Spring. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.]

M 12:20. Two labs to be arranged. P. I. Kuniholm.

Participation in a research project of dating modern and ancient tree-ring samples from the Aegean and Mediterranean. Supervised reading and laboratory work. A possibility exists for summer fieldwork in Greece or Turkey.

309 Dendrochronology of the Aegean (also Archaeology 309) Fall or spring. 4 credits. Limited to 10 students. Prerequisite: permission of instructor.

M 12:20. Two labs to be arranged. P. I. Kuniholm.

Participation in a research project of dating modern and ancient tree-ring samples from the Aegean and Mediterranean. Supervised reading and laboratory work. A possibility exists for summer fieldwork in Greece or Turkey.

319 Minoan-Mycenaean Archaeology Spring. 4 credits. Prerequisite: participants are expected already to have completed some course work in Mediterranean or Classical archaeology (e.g., Classics 219/Near Eastern Studies 267, Classics/History of Art 220). Students may not obtain credit for both this course and Archaeology/Classics/History of Art 221. Not offered 1987–88.

J. Coleman.

The art and archaeology of Greece and the Aegean in the Bronze Age (c. 3500–1100 B.C.). Detailed treatment is given to the Minoan and Mycenaean civilizations of the Late Neolithic and late Bronze Age. Other topics include the Neolithic "background" of Aegean civilization, the early Bronze Age in Greece, Crete, and the Cycladic islands; the volcanic eruption of Thera; and Aegean interconnections with Cyprus and the Near East and, in particular, the evidence for Mycenaean shipping, trade, and immigration from 1400–1100 B.C. Two papers will be presented in class, and these will subsequently be handed in and graded.

[320 Arts and Monuments of Athens (also History of Art 320) Spring. 4 credits. Prerequisite: Classics 220 or permission of instructor. Not offered 1987–88.]

M 1:25; J. Coleman.

Recent developments in the archaeology of Athens from the Geometric period to late antiquity. Topics will include consideration of the history and development of Athens, with an assessment of the influence of Athens on the rest of the Greek world and beyond.

[321 Archaeology of Cyprus (also History of Art 321) Spring. 4 credits. Prerequisite: Classics 220 or permission of instructor. Not offered 1987–88.]

M 9:05. A. Ramage.

Study of Cyprus from its first settlement in the Neolithic period until the end of the ancient world. Special emphasis on the Bronze Age, the acme of Cypriot culture, and the neighboring civilizations. Lectures and oral reports by students.

[322 Greeks and Their Eastern Neighbors (also History of Art 322) Fall. 4 credits. Prerequisite: Classics 220 or 221, or permission of instructor. Not offered 1987–88.]


A study of the archaeological and other evidence for the interaction between Greek civilization and the eastern and western Mediterranean from the thirteenth to the fourteenth centuries B.C.E. The course will focus on Greek relationships with Phoenicia and the rest of the Levant, Cyprus, Anatolia, and the Etruscans in the post–Bronze Age period.

[323 Painting in the Greek and Roman World (also History of Art 323) Spring. 4 credits. Not offered 1987–88.]

M 9:05. A. Ramage.

An examination of painting, mosaics, and mosaics from the ancient Mediterranean world will be studied in conjunction with the testimony of Greek and Roman sources. An attempt will be made to grasp the concerns and achievements of the Classical painters.

325 Greek Vase Painting (also History of Art 325) Spring. 4 credits.

A stylistic and iconographical approach to an art in which the Greeks excelled. The course will be arranged chronologically, from the early (eleventh century B.C.) anonymous beginnings to the "personal" hands of identifiable masters of the fifth and fourth centuries B.C. Styles other than Attic will be stressed.

[326 Art and Archaeology of Archaic Greece (also History of Art 326) Fall. 4 credits. Not offered 1987–88.]

A study of the formative period of Classical Greek civilization, based primarily on the evidence of art and architecture. Attention is concentrated on the beginnings and early developments of architecture, sculpture, and painting.

327 Greek and Roman Coins (also History of Art 327) Spring. 4 credits. Prerequisite: permission of instructor.

M 2:30 plus lab to be arranged. P. Kuniholm.

The various issues of Greek cities and the Roman state are examined. Coins are considered as art objects as well as economic and historical documents. The changes in design, value, and metals from the origins of coinage to the late Roman period are studied. Lectures, student presentations, and work with actual examples.

[328 Greek Architecture (also History of Art 328) Spring. 4 credits. Prerequisite: Classics 220 or permission of instructor. Not offered 1987–88.]

M 9:05. A. Ramage.

The art and archaeology of Greece and the Aegean in the Bronze Age (c. 3500–1100 B.C.). Detailed treatment is given to the Minoan and Mycenaean civilizations of the Late Neolithic and late Bronze Age. Other topics include the Neolithic "background" of Aegean civilization, the early Bronze Age in Greece, Crete, and the Cycladic islands; the volcanic eruption of Thera, and Aegean interconnections with Cyprus and the Near East and, in particular, the evidence for Mycenaean shipping, trade, and immigration from 1400–1100 B.C. Two papers will be presented in class, and these will subsequently be handed in and graded.

[329 Greek Sculpture (also History of Art 329) Spring. 4 credits.


This course will examine ancient Greek sculpture, both three-dimensional and two-dimensional, from the Archaic period to the Hellenistic. We will study various aspects of the works: technological advances in handling materials, the changing ideology of the sculptors, regionality of styles, and taste of individual patrons. Sculptures of marble and bronze will be considered, and comparisons with other ancient civilizations that influenced the Greek will be undertaken.


A study of the archaeological and other evidence for the interaction between Greek civilization and the eastern and western Mediterranean from the thirteenth to the fourteenth centuries B.C.E. The course will focus on Greek relationships with Phoenicia and the rest of the Levant, Cyprus, Anatolia, and the Etruscans in the post–Bronze Age period.

Herbert F. Johnson Museum of Art and the collection of the Department of Classics and with surveying equipment such as the total station. Special fieldwork required. Especially recommended for those planning to participate in summer field programs such as the Cornell project at Nemea and East Lokris in Greece.

[423 Ceramics (also History of Art 423) Spring. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.]

W 2:30–4:30. A. Ramage.

The growth and interaction of the Greek and Roman cities and their art will be studied using the finds and conclusions from the Cornell-Harvard excavations at Sardis as a focal point. The magnificent works of art and architecture will be set beside domestic remains and objects of daily life. We shall examine local themes in the context of the history, topography, and the larger political and economic situation of Asia Minor. Topics will change from semester to semester, from the early Bronze age to the late Byzantine era.

450 Research Questions in Mediterranean Archaeology Spring. 4 credits. Prerequisite: at least one course in archaeology. Not offered 1987–88.

M 10:45. J. Coleman.

A consideration of some of the important questions in the archaeology of early southeastern Europe, Greece, and the eastern Mediterranean and the techniques and strategies currently used to answer them. The questions are concerned both with field methods and the further interpretation of archaeological artifacts. Although the focus of the course may change somewhat from year to year, the questions to be considered will include some of the following: the use of computers in archaeological recording and interpretation; chronology, particularly radiocarbon dating and its dendrochronological calibration; environmental change, including climate and the late relative rise of sea level; strategies for excavation and surface survey, particularly in the Aegean and Cyprus; exploration of the ancient environment, especially copper mining and metallurgy in Europe, Greece, and Cyprus; and exploration of the evidence for early trade, particularly as concerns the export and imitation of Mycenaean ware; and, in a more general way, the interpretation of the evidence for early trade, particularly between Greece, Anatolia, and the eastern Mediterranean. Students will present two papers, one of which will involve work with practical data. Material from the Cornell collections and from the excavations at Alambra, in Cyprus, will be available for study. Three classes per week, one of which will be devoted to practical work and student papers.

475–476 Independent Study in Classical Archaeology, Undergraduate Level 475, fall; 476, spring. Up to 4 credits. Hours to be arranged. Staff.

[629 Seminar in Bronze Age Archaeology: Graduate Fall. 4 credits. Not offered 1987–88.]


A study of the early Bronze Age and its interconnections with the Aegean and the Near East in the middle and late Bronze Ages. Special focus on the problems of trade between Cyprus and the Aegean in the late Bronze Age.

[630 Seminar in Classical Greek Archaeology: Graduate Fall. 4 credits. Not offered 1987–88.]


A seminar on the fourth century B.C. Topics will focus on city and country life, the Panhellenic sanctuaries (including the recent excavations at Nemea), and the tombs and monuments of individuals, such as the so-called tomb of Philip II of Macedon.

Classics 125
G421 Greek Comparative Grammar (also Linguistics 609) Fall. 4 credits. Prerequisite: thorough familiarity with the morphology of classical Greek. MWF 10:10. A. Nussbaum. The prehistory and evolution of the sounds and forms of ancient Greek as reconstructed by comparison with the other Indo-European languages.

G422 Latin Comparative Grammar (also Linguistics 610) Fall or spring. 4 credits. Prerequisites: thorough familiarity with the morphology of classical Latin. Not offered 1987–88. A. Nussbaum. The prehistory and evolution of the sounds and forms of classical Latin as reconstructed by comparison with the other Indo-European languages.

G424 Italic Dialects (also Linguistics 612) Fall or spring. 4 credits. Not offered 1987–88. A. Nussbaum. The phonology and morphology of Faliscan, Oscan, and Umbrian studied through the reading of epigraphical texts. Attention to the relationships of these languages to Latin and the question of Proto-Italic.

G425 Greek Dialects (also Linguistics 611) Fall or spring. 4 credits. Not offered 1987–88. A. Nussbaum. A survey of the dialects of ancient Greek through the reading and analysis of representative epigraphical and literary texts.

G426 Archaic Latin (also Linguistics 614) Fall or spring, 4 credits. Prerequisite: reading knowledge of Latin. Not offered 1987–88. A. Nussbaum. Reading of epigraphic and literary preclassical texts with special attention to archaic and dialectal features. The position of Latin among the Indo-European languages to Latin and the question of Proto-Italic.

G427 Homeric Philology (also Linguistics 613) Fall or spring. 4 credits. Prerequisite: ability to read Homeric Greek. Not offered 1987–88. A. Nussbaum. The language of the Homeric epics: dialect background, archaisms, epicizations, modernizations. The notion of a Kunstsprache: its constitution, use, and internal consistency. The phonological and morphological aspects of epic compositional technique.

G429 Mycenaean Greek (also Linguistics 615) Fall or spring, 4 credits. Prerequisite: thorough familiarity with the morphology of classical Greek. Not offered 1987–88. A. Nussbaum. An introduction to the epigraphy, language, and content of the Linear B tablets with special attention to their implications for Greek historical grammar and dialectology.

Honors Courses

G470 Honors Course Spring. 4 credits. To be taken in the junior year. A program of reading and conferences centered on an author or topic chosen in accordance with the special interests of the student and instructor.

G471 Honors Course Fall. 4 credits. To be taken in the senior year. A continuation of Classics 370, with change of author or topic.

G472 Honors Course: Senior Essay Spring. 4 credits. For students who have successfully completed Classics 471. Topics must be approved by the student’s honors committee at the end of the first term of the senior year.

Related Courses in Other Departments

See listings under:
Archeology
Comparative Literature
English
History
History of Art
Medieval Studies
Modern Languages and Linguistics
Near Eastern Studies
Philosophy
Society for the Humanities
Women’s Studies

Comparative Literature

A. Caputi, chair (139 Goldwin Smith Hall, 255-4155).
W. Cohen, graduate faculty representative (343 Goldwin Smith Hall, 255-4179).
C. Caradec, director of undergraduate studies (317 Goldwin Smith Hall, 255-8265).
C. Arroyo, J. Boon, J. Culler, D. Figueira (Mellon Fellow).
G. Hayes, J. de Soto, S. Goodhart (visiting professor).
Cooperating:

The Department of Comparative Literature provides a broad range of courses in European as well as non-European literatures. Courses vary in stress significant authors, themes, problems, styles, genres, historical periods, and theoretical perspectives. The departmental offerings reflect current interdisciplin ary approaches to literary study, hermeneutics, rhetorical analysis, semiotics, deconstruction, Marxism, reception aesthetics, feminism, formalism, and psychoanalysis.

The Major

The major enables students to develop an integrated knowledge of Western literature, to strengthen their reading and writing abilities, and to prepare for careers on the basis of Western literature, to strengthen their reading and writing abilities, and to prepare for careers in the humanities. The requirements for the major are designed to develop critical reading abilities. 201: selections from the Bible, Homer, Aristophanes, Dante, Rabelais, Shakespeare, and others, 202: selections from Molière, Austen, Balzac, Baudelaire, Nietzsche, Freud, Kafka, Eliot, and others.

235 Modern Greek Poetry and Politics (also Classics 235, 3 credits, and Government 335, 4 credits) Fall. 3 credits. T R 1:25-2:40. G. Holst-Warhaft.

Cultural Theory, Comparative Literature 403, History of Literature, Comparative Literature 403, History of Literary Theory.

2) A second foreign language, especially for students interested in graduate work in literature.

Honors

A student who completes the requirements for the major is eligible for the degree of Bachelor of Arts with honors in comparative literature. The department bases its decision on the student’s achievements at the end of the senior year and on overall academic performance at Cornell.

Freshman Writing Seminars

Any 100-level course may be used toward satisfying the freshman writing seminar requirements. A full description of the freshman writing seminar program may be found on p. 10.

Courses

201–202 Great Books 201, fall; 202, spring or summer. 4 credits. Comparative Literature 201 and 202 may be taken independently of each other.

Fall: M W 10:10, F to be arranged, G. Goodhart.
Spring: M W T 11:15, F to be arranged, J. Monroe.
A reading each semester of seminal texts that represent and have shaped Western culture and hence form an essential part of the student’s intellectual equipment.

By analyzing, interpreting, and evaluating, students will develop critical reading abilities. 201: selections from the Bible, Homer, Aristophanes, Dante, Rabelais, Shakespeare, and others, 202: selections from Molière, Austen, Balzac, Baudelaire, Nietzsche, Freud, Kafka, Eliot, and others.

236 Greek Mythology (also Classics 236) Fall. 3 credits. T R 8:40–9:55. F. Ahl. An introduction to major myths of Greece and Rome as they appear in works of art, plays, poems, and (where necessary) scholarly literature from antiquity to the present day. Approximately two-thirds of the course will cover epic, mythological, and other ancient myths.

A. Nussbaum. A program of reading and conferences centered on an author or topic chosen in accordance with the special interests of the student and instructor.

A. Caputi, chair (139 Goldwin Smith Hall, 255-4155).
W. Cohen, graduate faculty representative (343 Goldwin Smith Hall, 255-4179).
C. Caradec, director of undergraduate studies (317 Goldwin Smith Hall, 255-8265).
C. Arroyo, J. Boon, J. Culler, D. Figueira (Mellon Fellow).
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Cooperating:

The Department of Comparative Literature provides a broad range of courses in European as well as non-European literatures. Courses vary in stress significant authors, themes, problems, styles, genres, historical periods, and theoretical perspectives. The departmental offerings reflect current interdisciplinary approaches to literary study, hermeneutics, rhetorical analysis, semiotics, deconstruction, Marxism, reception aesthetics, feminism, formalism, and psychoanalysis.

The Major

The major enables students to develop an integrated knowledge of Western literature, to strengthen their reading and writing abilities, and to prepare for careers in the humanities. The requirements for the major are designed to develop critical reading abilities. 201: selections from the Bible, Homer, Aristophanes, Dante, Rabelais, Shakespeare, and others, 202: selections from Molière, Austen, Balzac, Baudelaire, Nietzsche, Freud, Kafka, Eliot, and others.

235 Modern Greek Poetry and Politics (also Classics 235, 3 credits, and Government 335, 4 credits) Fall. 3 credits. T R 1:25-2:40. G. Holst-Warhaft.

The history of modern Greece has been marked by a series of political crises that have resulted in deep divisions in society. Greek poetry has reflected these crises and divisions: the poetry of nineteenth- and twentieth-century Greece will be interpreted in its historical and political context. It will concentrate on four periods in which the interaction has been particularly strong. The continuity of ancient Greek myths in modern Greek poetry will also be explored.

Students taking this course as Government 335 for 4 credits must write an additional paper on a political topic.
courty love lyric and romance. We will examine woman’s putative influence in literature, both positive and negative, and on man and society and the debates over woman’s “proper” attitude and role. Works in English translation will include a play by Hroswitha of Gandersheim, the Nibelungenlied, Wilhelmi, selected Monologues and mystical poems, courtly love lyric, Parzival, and Tristan and Isolde.

A. Caputi.
A study of the major traditions in Western drama from the beginnings among the Greeks to the Renaissance in England and Spain. The course will consist of both lectures and discussions focusing primarily on a close reading of the plays. But we shall also give attention to the physical conditions of production and to social and political contexts. Among the authors to be read will be Anouilh, Sophocles, Aristophanes, Marlowe, Shakespeare, and Lope de Vega.

353 European Drama, 1660 to 1900 (also Theatre Arts 326) 4 credits. Not offered 1987–88.
Staff.
Readings from major dramatists from Corneille to Chekhov, including Mollière, Congreve, Marivaux, Goldoni, Gozzi, Schiller, Kleist, Gogol, Ostrovsky, and Ibsen.

354 Modern Drama (also Theatre Arts 327) 4 credits.
A study of the major currents of modern drama against the background of modern culture. Readings in European drama from Ibsen to the present.

361 The Culture of the Early Renaissance (also Romance Studies 361 and History of Art 350) Fall. 4 credits.
Born with the collaboration of M. Migiel (Romance studies). D. Randel (music) and G. Teskey (English). Renaissance culture and society are introduced through major figures: Petrarch, Alberti, Dufay, Leonardo, Machiavelli, Erasmus, and Rabelais. Each figure will be the focal point for the critical examination of problematic issues in the areas of humanism, religion, and political thought, literature, art, music, and architecture. In the discussions, problems of interpretation will be approached through the analysis of primary source readings and works of art.

362 The Culture of the Later Renaissance (also History of Art 351) Spring. 4 credits.
Although Comparative Literature 361 (also History of Art 350) is not a prerequisite, this course continues its organization and deals with the immediately succeeding period. Members of various departments will lecture on Luther, Dürer, Michelangelo, Montaigne, Edmund Spencer, Monteverdi, Cervantes, and Galileo, with about two weeks devoted to each. Lectures and discussions will undertake close reading of texts, literary and visual, and will present methods of interpretation and of historical analysis. Written requirements: two short papers and final examination.

363–364 [The European Novel] 363, Fall; 364, Spring. 4 credits. Comparative Literature 363 and 364 may be taken independently of each other. [364 not offered 1987–88.]
Close reading of English and Continental novels from 1600 to 1950. 363: Cervantes to Dostoevsky. 364: Dostoevsky to the present. Lectures will include Voltaire, Scott, Stendhal, Balzac, Goethe, Flaubert, Hardy, Mann, and Nabokov. Analysis of novelistic subgenres: picaresque fiction, historical novel, moral fabic, re/c, detective story, and Bildungsroman.

387 The Russian Novel (in English translation) (also Russian 367) Fall. 4 credits. Also open to graduate students. Special disc for students who read Russian.
T R 9:05–9:55, plus one hour to be arranged.
G. Gibian.
Realism and modernism. Study of the major Russian prose writers of the nineteenth and twentieth centuries. Novels and short stories by Gogol, Turgenev, Tolstoy, Dostoevsky, Chekhov, Solzhenitsyn, and others. Special attention to the Soviet period.

388 Ideas and Form in Novels of Social Inquiry (also Russian Literature 388) Spring. 4 credits.
M W 9:05–G. Gibian.
From the French Revolution to the present. Problems of relations between politics and the writer. Literary representations of conflict between political ideologies (ideas of revolution, justice, nationalism) and the relations between a sense of belonging to a nation and to various other groups. Case studies of several national and ethnic groups will be examined. There will be guest lecturers.

392 Literature to Cinema (also Italian 390) Fall. 4 credits.
T R 7:30–9:30. A. Grossvogel.
A study of the ways literary language has influenced Italian cinema. The films to be screened will be by Antonioni, Bertolucci, Bolognini, De Sica, Fellini, Pasolini, Rossellini, Scola, Taviani, Visconti, Zeffirelli, and Zurlini. The works of literature to be read in conjunction with these films will include selections from Boccaccio’s Decameron and from the narrative works of Verga, Fogazzaro, D’Annunzio, Pirandello, and others.

396 German Film (also German Literature 396 and Theatre Arts 396) Fall. 4 credits. Requirements: participation in class discussion, one paper, a midterm and a final.
The goal of the course is to explore the form and context of German film in relation to the cultural and sociopolitical context of which it is a part. Accordingly the material will be divided into three major periods: Weimar film, 1918–33; Nazi film, 1933–45; and postwar film, 1945 to the present. Readings and lectures will be devoted to formal and cultural developments in the history of German film, as well as interpretive analysis of individual films. In both lectures and discussions emphasis will be on helping students develop an appropriate method for viewing and analyzing films.

K. Brazil.
Several weeks will be spent in studying the literary, performance, and aesthetic aspects of the noh theater. Emphasis will be on noh as a performance system, a total theater in which music, dance, text, costume, and props all interact to create the total effect. Then attention will turn to modern theater people who have reacted to noh in some creative way. Choice of dramatists will depend partly on student interests but will probably include Yeats, Brecht, Britten, Claudel, Grotowski, and Mishima. All readings may be done in English (translation).
401 Afro-American Literature: Black Women and Their Fictions (also English 401 and Africana Studies 401) Spring. 4 credits.
This course intends to define the precise shape and contours of the tradition of Black women’s writing in English. How do Black women use language to represent their experiences? How does her writing resemble or diverge from the Black male tradition? How does she define her own femininity within feminism? Theory? Readings by Harriet E. Wilson, Frances Harper, Nella Larsen, Zora Neale Hurston, Gwendolyn Brooks, Ann Petry, Pauline Marshall, Toni Morrison, Toni Cade Bambara, Gayle Jones, Alice Walker, Gloria Naylor, and Jamaica Kincaid.

The course will trace the origin and development of the detective theme, viewed as a parable for the problem of understanding and interpretation, from Sophocles’ Oedipus to Freud’s theories of the unconscious. It will then deal with the progressive automatization and popularization of the detective story (Wilkie Collins, Conan Doyle, Agatha Christie) and finally with its parodic reiteration (Borges). Attention will also be given to the genre’s relation to historical understanding and literary interpretation.

414 Situating Métis Women Writers: Myths of Race and Origin (also Society for the Humanities 414) Spring. 4 credits.
An examination of the ways in which the concept of race and geographical origin is either combined or enters into conflict with the textual production of women writers who draw on many traditions while remaining solidly rooted in Euro-American modern and postmodern poetry. The two poets have in common that helps to explain why they have been written only in English, but related reference to the Greek original will be made. Graduate students and undergraduates from other colleges who are interested in the material should not feel inhibited from enrolling. The approach will be primarily exegetical; that is, we will try to find out what the texts say and what they mean by what they say. Thus we can hope to stay open to scholarly and religious issues alike.

430 Poetry, Language, Politics Spring. 4 credits. Prerequisites: literature courses at the 200-level or above. Recommended for the concentration in modern European studies. Core course for majors.
Following an initial focus on theoretical texts by Saussure, Jakobson, Adorno, Bakhtin, and others, the seminars will enter into conflict with the textual production of women poets. The second half of the seminar will be devoted to the work of four contemporary poets—Enzensberger, Césaire, Ashbery, and Rich—who have demonstrated a keen interest in such questions and a profound sense of their importance for poetry in the twentieth century. All foreign-language texts may be read in translation.

431 Isms: General Concepts in Modern Cultural History (also Romance Studies 431) Fall. 4 credits.
An attempt to define humanism, baroque, classicism, romantism, realism, Marxism, symbolism, surrealism, existentialist, structuralist, and poststructuralist figures for the development of a poetry and poetics informed by questions of language and politics. The second half of the seminar will be devoted to the work of four contemporary poets—Enzensberger, Césaire, Ashbery, and Rich—who have demonstrated a keen interest in such questions and a profound sense of their importance for poetry in the twentieth century. All foreign-language texts may be read in translation.

440 Pessimism Fall. 4 credits.
An investigation of the theme of pessimism articulated by modern writers (Leopardi, Harnar, Schopenhauer, Kafka, Camus, and Sartre) and models culled from Greek, Buddhist, and Upanishadic sources.

462 Whitman, Dickinson, Baudelaire, Mallarmé (also English 462) Spring. 4 credits. Limited to 20 students. Prerequisites: experience in literary or art-criticism and interpretation. Reading knowledge of French is very useful but not required. Students interested in modernism in nonliterary arts are welcome.
Although (with one exception) there are no obvious direct connections among these four poets, they have in common that helps to explain why they have meant so much to readers in their time and especially since? Some points of comparison will come to mind right away, despite the differences: middle-class status and experience at a transitional moment. The nature of selected dramatic structures and fictional forms (especially in realism and surrealism) and their influence on the motion pictures derived from them.

621 The Cultural Origins of the Federal Revolution (also History 612, Romance Studies 612, and Government 610) Fall. 4 credits. Open to graduate students and advanced undergraduates.
The point of departure is a critical reappraisal of the very concept of the Enlightenment. This implies both a “rereading” of the eighteenth-century texts as well as of the modern theoretical and interpretive texts. It also requires a careful examination of the circulation and use of printed materials and their value in assembling an intellectual “sociability,” new trends in education, the process of de-Christianization, the shifting character of French elites, and the connections between elite and popular culture.

629–620 Independent Study 629, fall; 620, spring. Variable credit. Comparative Literature 619 and 620 may be taken independently of each other.
Hours to be arranged. Staff.

639 Tragedy and Philosophy (also Theatre Arts 639) Spring. 4 credits. R 2:30–4:30. S. Goodhart.
Netzsch’s famous aphorism in The Gay Science on the “death of God” pulls the rug out from under a long tradition of Panlitic human thinking. We will study some of the ways in which theatre and drama have already mounted in full the same challenge to mythic thinking, a prophetic challenge that the philosophical and literary tradition continued to succeed. Tragedy works systematically to subvert and replace. We will draw on plays from Sophocles, Shakespeare, Beckett, and others and read some of the major philosophical treatments of tragedy both among the Greeks (Plato and Aristotele) and since the beginning of the nineteenth century (Hegel, Kierkegaard, Nietzsche, Heidegger, and others). There will be no exams. Students will be asked to write a series of short critical papers and one long one.

682 The Afro-American Literary Tradition (also Africana Studies and English 682) Spring. 4 credits. Limited to 15 students with strong preparation in literature.
Hours to be arranged. H. Gates.
This course explores the emergence and formal development of the African American literary tradition from the eighteenth to the twentieth century. Close reading of the canonical texts in the tradition, and their structural relationships, will be stressed. Authors include Phillis Wheatley, Frederick Douglass, Richard Wright, Richard Wright, Zora Neale Hurston, Ralph Ellison, Toni Morrison, Alice Walker, Gloria Naylor, Amiri Baraka, Gwendolyn Brooks, and others.

The modern transnational-capitalist state rules not only by domination and coercion but by the "noncoercive coercion" of hegemony. What is the proper role of intellectuals (and who and what is an intellectual?) in cultural politics? How do "leftist" cultural critics, theorists, and artists living under late capitalism relate as individuals and collectively to racist socialist countries? What is the relationship of intellectuals to political parties? We will deal with the political and cultural writings of Antonio Gramsci—whether countries? What is the relationship of intellectuals to Leninist "orthodoxy"—and with the response of critics, artists, and cultural practices to Gramsci's challenge: the neorealist film Griffith's drama, Occupations, the paintings of Cremonini, Foucault's novel Daniel Martin, Pasolini's poem cycle "Ashes for Gramsci," the mass-media theories of Williams (The Passing Age), the political philosophy of Laclau and Mouffe (Hegemony and the Socialist Strategy), the theory and practice of "low-intensity conflict" as developed by the CIA and the NSC, and the cultural theories of Williams (Marxism and Literature) and Said (The World, the Text, and the Critic).

686 Fiction and Fictionality Fall. 4 credits. (A graduate core course.) W 2:30–4:30. W. W. Holdheim.

The course will deal with representative approaches to the theory of fiction and narrative, set against the background of the historical tradition from Aristotle to Hegel. It will also serve as an introduction to questions posed by the phenomenon of fictionality viewed as a category of discourse and/or existence. Barthes, De Man, Frank, Ingarden, and Jolles are among the modern writers to be examined. The discussion will also extend to theoretically fruitful passages in the novels of Cervantes, Gide, and Thomas Mann.

Computer Science


The Department of Computer Science is in both the College of Arts and Sciences and the College of Engineering. A student in either college can major in computer science. The following describes the College of Arts and Sciences major.

The Major

The major has three components: a core (a minimum of 42 credits), a group of electives in computer science and related fields (a minimum of 10 credits), and a concentration outside computer science (a minimum of 14 credits). The core focuses on the central topics within computer science: the logical design of programs, data structures, and algorithms. The remaining components of the major—the related electives and the outside concentration—provide a flexible extension to the core program. Students are expected to choose in consultation with their advisers the electives and the outside concentration that best suit their graduate and career plans.

Students interested in pursuing an advanced degree in theoretical computer science should concentrate in mathematics. Students preparing for advanced work in scientific computation should take Computer Science 621 (instead of Computer Science 222) and Computer Science 622 (as a related elective) and concentrate in some branch of applied mathematics. Qualified students are encouraged to concurrently major in mathematics.

Admission

The prerequisites for admission to the major are:
1) Completion of Computer Science 100–211–280 (or equivalent)
2) Completion of Mathematics 111–122–221 or Mathematics 191–192–293
3) A 2.75 grade-point average in all computer science and mathematics courses
4) Acceptance by the department's admissions committee

After admission, students are expected to maintain at least a 2.75 grade-point average in their major courses. Any grade below C– in a core course or related elective is not acceptable.

Core

The core consists of the following courses:
1) Calculus and linear algebra: Mathematics 111–122–221–222 or 191–192–293–294
2) Programming and systems: Computer Science 100, 211, 310, and 314
3) Theory of computation: Computer Science 280, 381, and 382. (One of the following may be substituted for Computer Science 280: Mathematics 332, 381, or 432.)
4) Numerical analysis: Computer Science 222 or 421

Related Electives

The related electives requirement consists of three courses. One must be a computer science course or course/laboratory combination numbered above 400 that includes a substantial programming project, for example, Computer Science 412, 444/445, 417 or 432/433; the other two are to be selected from the following:
- Electrical engineering courses numbered 230 or higher
- Operations research courses numbered 260 or higher
- Mathematics courses numbered 381 or higher
- Computer Science courses numbered 400 or above (except Computer Science 415, 418, 433, and 600 and seminar courses)

Students are expected to select related electives that complement their concentration.

Concentration

This component encourages the student to study some discipline outside of computer science in reasonable depth. The concentration consists of an approved sequence of four courses (at least 14 credits) numbered 200 or higher in some field related to the theoretical or practical aspects of computing. A list of approved concentrations is available in the Computer Science Undergraduate Office, 303 Upson Hall. Students may also design their own concentrations, subject to the approval of their adviser. The concentration requirement is waived for students who concurrently major in a related field such as mathematics, linguistics, or psychology.

Other Requirements

Computer science majors must also satisfy the College of Arts and Sciences and university requirements. In particular, the student is required to take four computer science courses numbered 200 or higher. Students are also required to include at least one course in the field of probability and statistics in their program of study. Although there is no formal department of statistics at Cornell, the Department of Mathematics and the School of Operations Research and Industrial Engineering offer a wide range of probability and statistics courses suitable for computer science majors, including the following introductory two-course sequences:
- Math 471, Basic Probability
- Math 472, Statistics
- ORIE 290, Introductory Engineering Probability
- ORIE 370, Introduction to Statistical Theory with Engineering Applications

A less rigorous but satisfactory one-semester introduction to probability and statistics is given in either of:
- Math 370, Elementary Statistics
- ORIE 270, Basic Engineering Statistics

Honors. A student may be granted honors in computer science on the recommendation of the Computer Science Academic Affairs Committee. The committee guidelines will generally be the following:
1) An overall grade-point average of not less than 3.25
2) A grade-point average for all computer science courses of not less than 3.5
3) Satisfactory completion of at least two computer science courses numbered above 600 or satisfactory completion of a significant special investigation (Computer Science 490)
310 Data Structures Fall, spring, or summer. 4 credits. Prerequisite: Computer Science 280 or permission of instructor. 2 lecs. 2 evening exams.

314 Introduction to Computer Systems and Organization Fall, spring, or summer. 4 credits. Prerequisite: Computer Science 211 or equivalent. 2 lecs. 1 sec. 2 evening exams.

381 Introduction to Theory of Computing Fall. 4 credits. Prerequisites: Computer Science 280 or permission of instructor. 3 lecs.

382 Introduction to Analysis of Algorithms Spring. 4 credits. Prerequisites: Computer Science 310 and 381 or permission of instructor. 3 lecs.

400 The Science of Programming Spring. 4 credits. Prerequisite: Computer Science 280 or equivalent. 3 lecs. D. Gries.

411 Programming Languages and Logic Spring. 4 credits. Enrollment limited. Prerequisites: Computer Science 310 and permission of instructor. 2 lecs.

412 Introduction to Compilers and Translators Fall. 4 credits. Prerequisite: Computer Science 314. Prerequisite or corequisite: Computer Science 381. Not offered every year. 3 lecs.

414 Systems Programming and Operating Systems Fall. 3 credits. Prerequisite: Computer Science 314 or permission of instructor. 2 lecs. 2 evening exams.

415 Practicum in Operating Systems Fall. 2 credits. Prerequisite: Computer Science 310. Corequisite: Computer Science 414. 1 lec.

417 Computer Graphics (also Architecture 374) Spring. 3 credits. Prerequisite: Computer Science 211. Not offered every year. 2 lecs. 1 lab.


[421 Numerical Solution of Algebraic Equations Fall. 4 credits. Prerequisites: Mathematics 294 or 222, one additional mathematics course numbered 300 or higher, and knowledge of FORTRAN at the Computer Science 222 level. Not offered 1987–88. 3 lecs.]

432 Introduction to Database Systems Spring. 3 credits. Prerequisite: Computer Science 211 and 310 or permission of instructor. Recommended: Computer Science 314. 2 lecs. 1 rec.

433 Practicum in Database Systems Spring. 2 credits. Corequisite: Computer Science 432. 1 lab.

472 Introduction to Artificial Intelligence Fall. 4 credits. Prerequisite: Computer Science 310. Open to juniors, seniors, and graduate students. 2 lecs. 1 sec.

[484 Introduction to Symbolic Computation Spring. 4 credits. Prerequisites: Computer Science 481 or Mathematics 332 or 432 or permission of instructor. Not offered 1987–88. 2 lecs.]

486 Applied Logic (also Mathematics 486) Spring. 4 credits. Prerequisite: Mathematics 222 or 294, Computer Science 100, and an additional course in mathematics or theoretical computer science. 2 lecs. 1 lab to be arranged.

490 Independent Reading and Research Fall or spring. 1–4 credits.

561 Introduction to Robotics (also Mechanical and Aerospace Engineering 517) Fall. 3–4 credits. Prerequisite: computer programming and calculus. Enrollment limited; intended for graduate students but open to seniors. 1 lec. 2 labs.

600 Computer Science and Programming Fall. 1 credit. Prerequisite: graduate standing in computer science or permission of instructor. 1 lec.

601 Introduction to Programming Logics Spring. 1 credit. Prerequisite: graduate standing in computer science or permission of instructor. 1 lec.

611 Advanced Programming Languages Fall. 4 credits. Prerequisite: Computer Science 310 or permission of instructor. 3 lecs.

612 Translator Writing Spring. 4 credits. Prerequisites: Computer Science 310 and 381 or permission of instructor. 3 lecs.

613 Concurrent Programming and Operating Systems Principles Spring. 4 credits. Prerequisites: Computer Science 414 and 600 or permission of instructor. 3 lecs.

614 Advanced Operating Systems Spring. 4 credits. Prerequisite: Computer Science 414 or permission of instructor. 2 lecs.

[615 Machine Organization Spring. 4 credits. Prerequisite: Computer Science 314 or permission of instructor. Not offered 1987–88.]

616 VLSI Algorithms Spring. 4 credits. Prerequisites: permission of instructor. 2 lecs.

621 Matrix Computations Fall. 4 credits. Prerequisites: Mathematics 411 and 431 or permission of instructor. 3 lecs.

622 Numerical Optimization and Nonlinear Algebraic Equations Spring. 4 credits. Prerequisite: Computer Science 621. 3 lecs.

632 Database Systems Fall. 4 credits. Prerequisites: Computer Science 310 and either Computer Science 432 or permission of instructor. 2 lecs.

635 Automatic Text Processing and Information Retrieval Spring. 4 credits. Prerequisite: Computer Science 310 or equivalent or permission of instructor. 2 lecs.

643 Design and Analysis of Computer Networks Fall. 4 credits. Prerequisite: Computer Science 414 or permission of instructor. Not offered every year. 2 lecs.

652 Sparse Matrix Theory: Combinatorial Algorithms and Numerical Computation Spring. 4 credits. Prerequisites: Computer Science 621 and 681 or permission of instructor. Not offered every year. 2 lecs.

655 Mathematical Foundations for Computer Modeling and Simulation (also Mathematics 655) Fall. 4 credits. Prerequisite: Mathematics 431 and 432, or the equivalent in both content and level of mathematical sophistication or permission of instructor. Not offered every year. 3 lecs.

661 Robotics Fall. 4 credits. Prerequisites: Computer Science 611 and 681 or permission of instructor. Not offered every year. 3 lecs.

662 Robotics Laboratory Fall. 1 credit. Prerequisite: graduate standing or permission of instructor. Not offered every year. 1 lab.

671 Introduction to Automated Reasoning Fall. 4 credits. Prerequisites: Computer Science 611 and 681 and Mathematics 581. Not offered every year. 3 lecs.

681 Analysis of Algorithms Fall. 4 credits. Prerequisites: Computer Science 381 or permission of instructor. 3 lecs.

682 Theory of Computing Spring. 4 credits. Prerequisite: Computer Science 381 or permission of instructor. 3 lecs.

709 Computer Science Graduate Seminar Fall or spring. 1 credit. S-U grades only. For staff, visitors, and graduate students interested in computer science.

711 Topics in Programming Languages and Systems Spring. 4 credits. Prerequisites: Computer Science 381 and 611 or permission of instructor. Not offered every year. 2 lecs.

712 Topics in Programming Languages and Systems Spring. 4 credits. Prerequisites: Computer Science 612. Not offered every year. 2 lecs.

713 Seminar in Operating Systems Fall or spring. 4 credits. Prerequisite: Computer Science 613 or permission of instructor. Not offered every year.

714 Distributed Computing 4 credits. Prerequisites: Computer Science 414 and an advanced systems course (e.g., Computer Science 614, H 632, or 643). Not offered every year. 2 lecs.

715 Seminar in Programming Refinement Logics Fall or spring. 4 credits. Prerequisite: permission of instructor.

719 Seminar in Programming Fall or spring. 4 credits. Prerequisite: Computer Science 611 or permission of instructor. S-U grades only.

721 Topics in Numerical Analysis Fall. 4 credits. Prerequisite: Computer Science 621 or 622 or permission of instructor. Not offered every year. 2 lecs.

722 Topics in Numerical Analysis Spring. 4 credits. Prerequisite: Computer Science 621 or 622 or permission of instructor. Not offered every year. 2 lecs.

729 Seminar in Numerical Analysis Fall or spring. 1–4 credits to be arranged. Prerequisite: permission of instructor. S-U grades only.

[733 Selected Topics in Information Processing Not offered 1987–88. 2 lecs.]
Arranged. Prerequisite: Computer Science 733 or permission of instructor. Not offered 1987-88.

Seminar in Text Processing and Information Retrieval Fall or spring. Credit to be arranged. Prerequisite: Computer Science 635 or permission of instructor: S-U grades only.

Seminar in Systems Modeling and Analysis Fall or spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

Topics in Analysis of Algorithms and Theory of Computing Spring. 4 credits. Prerequisites: Computer Science 681 and 682 or permission of instructor: S-U grades only. Not offered every year. 2 lecs.

Topics in Analysis of Algorithms and Theory of Computing Fall or spring. 4 credits. Prerequisite: Computer Science 681 and 682 or permission of instructor: S-U grades only. Not offered every year. 2 lecs.

Seminar in Theory of Algorithms and Computing Fall or spring. 2-4 credits. Prerequisite: permission of a computer science adviser.

Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser: S-U grades only.

Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser: S-U grades only.

Special Investigations in Computer Science Fall or spring. Prerequisite: permission of a computer science adviser: S-U grades only.

Dutch

See Modern Languages, Literatures, and Linguistics.

Economics


The study of economics provides an understanding of the way economies operate and insight into public issues. The department offers a broad range of undergraduate courses in such fields as money and banking; international and comparative economics; econometrics; theory; history; growth and development; and the organization, performance, and control of industry.

The Major

Students who want to major in economics must have completed Economics 101 – 102 or equivalent courses and Mathematics 111 or its equivalent with grades of C or better. Prospective majors should apply at the department office. Students considering a major in economics should take Economics 313 and 314 instead of Economics 311 and 312.

The requirements for a major are (1) Economics 313, 314, and 315 and (2) 20 credits of other economics courses listed by the Department of Economics, except that Economics 399 will not count toward the 20-credit requirement. With the permission of the major adviser, one or (in exceptional cases) two economics courses may be applied to the College of Arts and Sciences may be applied to fulfill this requirement. Also with the major adviser's permission, a statistics course offered by another department may be substituted for Economics 319.

An honors program is currently being offered. Students should consult the director of undergraduate studies before May in their junior year for more information. Students planning graduate work in economics or business are strongly encouraged to prepare themselves well in mathematics and econometrics.

Courses

101 Introductory Microeconomics Fall, spring, or summer. 3 credits. Economics 101 is not a prerequisite for 102.

Lecs and disc. Explanation and evaluation of how the price system operates in determining what goods are produced, how goods are produced, and who receives income, and how the price system is modified and influenced by private organizations and government policy.

102 Introductory Macroeconomics Fall, spring, or summer. 3 credits. Economics 101 is not a prerequisite for 102.

Lecs and disc. Analysis of aggregate economic activity in relation to the level, stability, and growth of national income. Topics discussed may include the determination and effects of unemployment, inflation, balance of payments deficits, and economic development, and how these may be influenced by monetary, fiscal, and other policies.

301 Economics of Market Failure Fall. 4 credits. Prerequisites: Economics 101-102 or permission of instructor. This course provides an introduction to statistical inference and to principles of probability. It includes descriptive statistics, principles of probability, discrete and continuous random variables, and statistical inference.

303 Positive and Normative Theories of Income Distribution Spring. 4 credits. Prerequisite: permission of instructor. Cannot be applied to the major.

After examining the distinction between the terms positive and normative as used in economics, this course will explore three main questions: (1) Why is income distributed the way it is? (2) How should income be distributed? (3) What is the relationship between males and females in the labor force? Particular emphasis will be given to the theories of income distribution, both positive and normative, that tend to dominate discussion of these topics in America.

304 Economics and the Law Fall. 4 credits. Prerequisite: Economics 311 or 313 or permission of instructor. An examination, through the lens of economic analysis, of legal principles drawn from a variety of legal fields, including contracts, property, torts, and procedure. No legal training is required.

306 Economics of Defense Spending Spring. 4 credits. Prerequisites: Economics 101–102. The economic aspects of defense spending are analyzed. Emphasis is on the procurement of weapons systems. Topics covered include an overview of the defense budget, special characteristics of the defense market, the structure of the defense industry, and the economic behavior of defense firms.

307 Introduction to Peace Science Fall. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. Introduction to theories and research on conflict resolution. Topics include conflict, its role and impact on society; theories of aggression and altruism; causes of war; game theory; conflict management procedure and other analytical tools and methods of peace science; alternatives to war.

308 Economic Analysis of Government (also Civil and Environmental Engineering 322) Spring. 4 credits. Prerequisites: calculus plus Economics 313 or Civil and Environmental Engineering 321. Analysis of economic bases for government intervention in a market economy. Topics include public goods, cost-benefit analysis, public finance, environment regulation and risk management, and macroeconomic topics.

309 Capitalism and Socialism (also Industrial and Labor Relations 347) Fall. 4 credits. Prerequisite: permission of instructor.

311 Intermediate Microeconomic Theory Fall, spring, or summer. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. The pricing processes in a private enterprise economy are analyzed under varying competitive conditions, and their role in the allocation of resources and the functional distribution of national income is considered.

312 Intermediate Macroeconomic Theory Fall, spring, or summer. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. The theory of national income determination and economic growth in alternative models of the national economy is introduced. The interactions and relation of aspects of these models of empirical aggregate economic analysis is examined.

313 Intermediate Microeconomic Theory Fall, spring, or summer. 4 credits. Prerequisites: Economics 101–102 and calculus. For description see Economics 311.

314 Intermediate Macroeconomic Theory Fall, spring, or summer. 4 credits. Prerequisites: Economics 101–102 and calculus. For description see Economics 312.

315 History of Economic Thought Fall. 4 credits. Prerequisites: Economics 101–102 or permission of instructor. Selected readings from the works of Adam Smith, T. Malthus, D. Ricardo, J. S. Mill, L. Walrus, J. A. Schumpeter, A. Marshall, and J. M. Keynes.

317 Intermediate Mathematical Economics I Fall. 4 credits. Introduction of calculus and matrix algebra; problems of maximization of a function of several variables. Economic examples are used to illustrate and teach the mathematical concepts.

318 Intermediate Mathematical Economics II Spring. 4 credits. Advanced techniques of optimization and application to economic theory.

319 Introduction to Statistics and Probability Fall or summer. 4 credits. Prerequisites: Economics 101–102 and calculus (Mathematics 111 or equivalent). This course provides an introduction to statistical inference and to principles of probability. It includes descriptive statistics, principles of probability, discrete
and continuous distributions, and hypothesis testing (of sample means, proportions, variance). Regression analysis and correlation are introduced.

320 Introduction to Econometrics  Spring. 4 credits. Prerequisites: Economics 101–102, 319, or equivalent, and calculus.

Introduction to the theory and application of econometric techniques. How econometric models are formulated, estimation used to test hypotheses, and how to evaluate econometric results in studies using regression model, multiple regression model, and introduction to simultaneous equation models.

323 American Economic History  Fall. 4 credits. Problems in American economic history from the first settlements to early industrialization are surveyed.

324 American Economic History  Spring. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.

A systematic treatment of an American economic history from the Civil War to World War I.

325 Economic History of Latin America  4 credits. Open to upper-class students with some background in economics or history, or with permission of instructor.

History of the changing structure of American business from 1800 to the present, with major emphasis on developments after the Civil War. The focus of the course will be the changing structure of challenges (for example, the rise of unions, development of a national capital market, changing role of government) and the various responses of business organizations and entrepreneurs to those challenges.

329 Eastern Europe Today: Economics, Government, Culture (also Government 326 and Russian 329)  Spring. 4 credits. Economics majors cannot use this course to fulfill major requirements. Introductory interdisciplinary survey of Poland, Hungary, Czechoslovakia, and Yugoslavia since World War II, with emphasis on contemporary development. The goals of the course are to examine differences (the variety of backgrounds) among East European countries, the common elements (for example, political relations with the USSR), domestic situations, the economy, and culture.

330 The Soviet Union: Politics, Economics, and Culture (also Government 330 and Russian 330)  4 credits. Economics majors cannot use this course to fulfill major requirements. Interdisciplinary survey of the USSR since the Revolution, with emphasis on contemporary developments.

331 Money and Credit  Spring or summer. 4 credits. Prerequisites: Economics 101–102. A systematic treatment of the determinants of the money supply and the volume of credit. Economic analysis of credit markets and financial institutions in the United States.

333 Theory and Practice of Asset Markets  Fall or summer. 4 credits. Prerequisites: Economics 311 or 313, and 312 or 314. The theory and decision-making in the presence of uncertainty and the practical aspects of particular asset markets are examined.

335 Public Finance: The Microeconomics of Government  Fall. 4 credits. Prerequisites: Economics 1–102, one semester of calculus, or permission of instructor.

The role of government in a free market economy is analyzed. Topics covered include public goods, market failures, allocation mechanisms, optimal taxation, effects of taxation, and benefit-cost analysis. Current topics of an applied nature will vary from term to term.

336 Public Finance: Resource Allocation and Fiscal Policy  Spring. 4 credits. Prerequisites: Economics 101–102, one semester of calculus, or permission of instructor.

A continuation of Economics 335 covering macroeconomic and special topics. Subjects covered include the federal budget, the budget, and government regulation and transfers, as well as problems like local public goods, the hierarchy of governmental structure, plus a variety of applied problems.

338 Macroeconomic Policy  Fall. 4 credits. Prerequisite: Economics 312 or 314.

The use of fiscal and monetary policies for achieving full employment, price-level stability, and appropriate economic growth are studied.

341 Labor Economics  Fall. 4 credits. Prerequisites: Economics 101–102.

342 Problems in Labor Economics (also Industrial and Labor Relations 343)  Fall. 4 credits. Prerequisites: Economics 311 or 313 or Industrial and Labor Relations 240.

The theory and empirical analysis of labor markets and their applications to policy issues are considered in depth. Specific topics covered in this course are designed to increase each student's competence in applying microeconomic theory and econometrics to policy issues through an econometric research project.

347 Economics of Evaluation 4 credits. An introduction to the methodologies used by economists to evaluate the impacts of social-action programs and legislation. General evaluation methodology, cost-benefit analysis, and econometrics are discussed. Case studies are considered to illustrate the uses of these techniques, to acquaint the student with major current government programs and legislation, and to estimate these programs' economic impacts. Throughout, the primary analytic framework used by the instructor is microeconomics.

351 Industrial Organization  Fall. 4 credits. Prerequisite: Economics 101. Recommended: Economics 311 or 313 would be useful.

This course concerns the ways in which markets in a modern economy deviate from the ideal of perfect competition studied in Economics 101, the consequences of those deviations, and (if appropriate) the cures. It provides a basic introduction to problems involving monopoly, oligopoly, vertical integration, mergers, and the efforts of our legal system.

352 Advanced Topics in Industrial Organization  Spring. 4 credits. Prerequisites: Economics 101 and 351 and some knowledge of calculus. Recommended strongly: Economics 311 or 313.

This course is an extension of 351 and will emphasize (a) more advanced topics in the theory of industrial organization with special attention to recent developments in the literature; and (b) empirical analysis of numerous issues relating to the structure of markets and their performance.

354 Economics of Regulation  Spring. 4 credits. Prerequisites: Economics 313 or Civil and Environmental Engineering 321.

Explores technological bases for government intervention in the private market economy, which include decreasing cost industries (natural monopolies) and technical externalities (pollution and risk). The economic implications of regulating electric, gas, and communications and transportation utilities, including pricing, service quality, efficiency incentives, and long-range planning issues, are examined in detail. Topics on competition and societal risk management are also explored.

355 Politics and Markets  Fall. 4 credits. Prerequisites: Economics 311 or 313, and 312 or 314, or equivalents.

The course uses the tools of applied price theory to examine the tension between individual and collective goals in the modern welfare state. Topics covered include theories and policies related to income redistribution, regulation of the labor contract, paternalism, and the left's critique of capitalism.

357 Economics of Imperfect Information  Spring. 4 credits. Prerequisites: Economics 101–102 and 319, or equivalent.

This course covers a variety of topics in the economics of uncertainty, including basic decision theory, search theory, risk insurance, and equilibrium price dispersion.

358 Current Economic Issues  Fall. 3 or 4 credits (A research paper will be required if the 4-credit option is chosen.) Prerequisites: Economics 101–102.

The emphasis will be on the application of simple microeconomics and industrial organization concepts to the formulation of public policy in the present and recent past. Among the topics likely to be covered will be policies relating to energy, communications, and transportation; the financing and delivery of medical care, public utility, and other kinds of regulation; and the economics of inflation.

361 International Trade Theory and Policy  Fall. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.

The principles that have guided the formulation of international trade and commercial policies are surveyed. The evolution of the theory of international trade, principles and practice of commercial policy, problems of regional integration and customs unions, and institutions and practices of state trading are considered.

362 International Monetary Theory and Policy  Spring or summer. 4 credits. Prerequisites: Economics 101–102 or permission of instructor.

The principles that have guided the formulation of international financial policies are surveyed. The evolution of the theory of balance of payments adjustment, international monetary standards, international capital movements, economic aid, and international monetary institutions, and proposals for international monetary reforms are considered.

366 The Economy of the Soviet Union  Fall. 4 credits. Prerequisites: Economics 101–102. A survey of the Soviet economic system and Soviet economic development since 1917. Both institutional and theoretical aspects will be considered. Emphasis will be on current developments, including East-West economic and military competition, economic relations with the Eastern Bloc and with Western Europe, and foreign trade.

367 Comparative Economic Systems: Soviet Union and Europe  Fall. 4 credits. Prerequisite: Economics 311–312 or permission of instructor.

Discussion of approaches to comparison of economic systems. Consideration of abstract models (market economy, central planning, decentralized socialist market) as well as national economies (France and Sweden, Yugoslavia, and Soviet Union). Possibility of convergence of economic systems is explored.

368 Comparative Economics: United States, Europe, and the Soviet Union  Spring or summer. 4 credits. Prerequisites: Economics 101–102. Intended for students who are not majoring in economics. European and Soviet economics after the Second World War are surveyed. The European countries studied include France, Sweden, and Italy in the West, and Yugoslavia plus another country in the East. A descriptive and institutional approach is used and designed for nonmajors.

369 Selected Topics in Socialist Economies: China  Spring. 4 credits. Prerequisite: Economics 101–102.

Examines the development of Chinese economy and the evolution of China's economic system since 1949.
370 Issues in Poverty and Development  Spring  4 credits.
The course will introduce current issues and controversies in the field of development economics. Questions to be discussed will include: What are the obstacles to development according to the different schools of thought? Which countries have made significant progress in the last three decades and why? What are the kinetics of economic growth in less-developed countries. Trade-offs between growth, welfare, and equity; the legacy of colonialism; relevance of history and economic theory; problems of capital formation, economic planning and integration; implications of the theories of industrialization, agricultural development, and population change are emphasized.

371 Economic Development Fall  4 credits.
Prerequisites: Economics 311, 313, and 320 and calculus.
Study of the problem of sustaining accelerated economic growth in less-developed countries. Trade-offs between growth, welfare, and equity; the legacy of colonialism; relevance of history and economic theory; problems of capital formation, economic planning and integration; implications of the theories of industrialization, agricultural development, and population change are emphasized.

372 Applied Economic Development Spring  4 credits.
Prerequisites: Economics 311 or 313.

373 International Specialization and Economic Development Fall  3 credits.
Prerequisites: Economics 101–102 or permission of instructor.
The assessment of the gains and risks and the appropriate role for specialization and trade in economic development that have been pursued; and how successful have they been? The required readings will be supplemented with outside speakers and film presentations.

381 Economics of Participation and Workers' Management Fall  4 credits.
Prerequisites: Economics 311 or 313, and 320 or 314.
After a historical survey of the ideas and practices of self-management and worker's cooperation, the main economic issues relating to the participatory firms and economies will be studied. Special attention will be given to the outcome of the decision-making process at the level of the enterprise, the consistency of these outcomes with national plans, and the policies used to implement them. Examples will be drawn from the Yugoslav experience and, depending on student interest, the discussion will cover other foreign experiences such as Algeria, the Basque region, Chile, West Germany, Israel, Peru, and others. A considerable emphasis will be placed on developments and new possibilities of implementing democratic, worker-owned and worker-managed enterprises in the United States. Drawing on theoretical analysis developed in the course, appropriate institutions and legal forms of self-management in the United States will be examined.

382 The Practice and Implementation of Self-Management Spring  4 credits.
The various forms of labor participation in the world today are described, and how producer cooperatives and labor-managed firms and systems can be created is explained. Extensive use is made of the theory of labor-managed systems. The history of various doctrines and self-managed experience is considered.

399 Readings in Economics Fall or spring.
Variable credit.
Independent study.

416 Intertemporal Economics Fall  4 credits.
Prerequisites: Economics 311 or 313 and calculus.
The course is intended for advanced economics majors and serves as a bridge to more advanced courses in the area of the subject. Topics to be covered: (a) review of the one good Ramsey model of optimal savings and accumulation; conditions for intertemporal efficiency in production; comparative dynamics of capital accumulation; (b) some earlier models of capital accumulation; the roles of present value and internal rate of return in guiding investment decisions; (c) growth, exhaustible resources, pollution and sustainable development, discussion of the trade-offs facing a society.

419 Economic Decisions under Uncertainty Fall  4 credits.
Prerequisites: Economics 311 or 313 and calculus.
The course provides an introduction to the theory of decision making under uncertainty with emphasis on applications of economic theory.

445 Topics in Microeconomic Analysis—Markets and Planning Fall  4 credits.
Prerequisites: Economics 311 or 313, and one term of calculus.
This is a course of economic theory designed for upperclass undergraduates. Course content may vary from year to year. Issues that may be examined here include (1) How can economic activities be efficiently organized through the market mechanism? (2) Why are some market failures important, and how can they be reduced? (3) How can economic planning be decentralized efficiently? This course serves two purposes: (1) to introduce concepts that are novel to undergraduates and relevant to public policy but require only a modicum of analytic tooling up, and (2) to illustrate the deductive power of modern economic analysis—how to define concepts unambiguously, how to form propositions in clear-cut fashion, and how to follow up logical implications sequentially to the conclusion.

446 Topics in Macroeconomic Analysis—Is Keynesianism Dead? Spring  4 credits.
Prerequisites: Economics 312 or 313, and one term of calculus.
The coverage of this course may vary from term to term. Presently the content of the course deals with the range of criticisms against Keynesian theory by the New Classical and monetarist schools, the rational expectations school, and the EMH. The main topics are: the theory of price determination; the determination of output; the determination of employment; and the determination of money and interest rates. These are the main topics that are covered.

452 Economic Effects of Participation and Labor-managed Systems Spring  4 credits.
Prerequisites: Economics 311 or 313, and 320, 381, and calculus.
The course applies microeconomic theory to analyze the interaction of firms and unions. The course will be presented in several parts: (a) models of trade unions and unions; (b) analysis of the performance of firms in which employees either participate or do not participate in the decision-making process or make all the important decisions. Numerous empirical studies are examined with particular emphasis on their ability to model the relevant institutions and test the results of theoretical predictions with appropriate econometric methods.

481 Economic Effects of Participation and Labor-managed Systems Spring  4 credits.
Prerequisites: Economics 311 or 313, and 320, 381, and calculus.
The course applies microeconomic theory to analyze the interaction of firms and unions. The course will be presented in several parts: (a) models of trade unions and unions; (b) analysis of the performance of firms in which employees either participate or do not participate in the decision-making process or make all the important decisions. Numerous empirical studies are examined with particular emphasis on their ability to model the relevant institutions and test the results of theoretical predictions with appropriate econometric methods.

482 Practical Aspects of Business Management of Worker Enterprises Spring  4 credits.
Prerequisites: Economics 311 or 313, and 312 or 314.
May be taken concurrently with or following Economics 382/582, 482, and 483, both graduate and undergraduate, are welcome to participate as teacher-student interns. They may receive additional independent study credits for this work.

483 The Technological and Product Base of Worker Enterprises, with Special Emphasis on Ecology and Solar Energy Applications Spring  4 credits.
Prerequisites: Economics 311 or 313, and 312 or 314. May be taken concurrently with or following Economics 382/582 and 482.
This course is designed to further and deepen undergraduate and graduate students' knowledge of workers' self-management and cooperation, especially in view of actual formation of democratic enterprises. Students who have taken all three courses, Economics 382/582, 482, and 483, both graduate and undergraduate, are welcome to participate as teacher-student interns. They may receive additional independent study credits for this work.

503 Nonparametric Methods for Peace Scientists and Regional Scientists Fall  4 credits.
Topics to be covered include advantages and disadvantages of parametric and nonparametric methods; problems involved in measurement, nonparametric methods based on one sample and many samples, nonparametric methods requiring only nominal measurement, and those requiring only ordinal measurement; nonparametric measures of association; procedures for nonnormal distributions.

504 Economics and the Law Fall  4 credits.
For description see Economics 304.

505 Interdependent Decision Making Fall  4 credits.
The basic elements in interdependent decision-making situations are examined. Situations where decision makers have different sets of objectives that they wish to achieve and employ different criteria for
evaluating performance are focused on. The use of maximizing incremental procedures, game theory, and diverse methods of establishing priorities and cooperative action as well as recursive, interactive approaches to resolve conflict are considered.

Coalition theory and related topics are covered.

509 **Microeconomic Theory I** Fall. 4 credits. Topics in consumer and producer theory.

510 **Microeconomic Theory II** Spring. 4 credits. Topics in consumer and producer theory, equilibrium models and their applications, externalities and public goods, intertemporal choice, simple dynamic models and resource depletion, choice under uncertainty.

513 **Macroeconomic Theory: Static Income Determination** Fall. 4 credits.

514 **Macroeconomic Theory: Dynamic Models, Growth, and Inflation** Spring. 6 credits.

516 **Applied Price Theory** Fall. 4 credits. The course emphasizes the applications of the principles of price theory to a variety of problems taken from concrete, practical settings.

517 **Intermediate Mathematical Economics I** Fall. 4 credits.

518 **Intermediate Mathematical Economics II** Spring. 4 credits.

519 **Econometrics I** Fall. 4 credits. Prerequisites: Economics 319–320 or permission of instructor. This course gives the probabilistic and statistical background for meaningful application of econometric techniques. Topics to be covered are (1) probability theory: probability spaces, random variables, distributions, moments, transformations, conditional distributions, distribution theory and the multivariate normal distribution, convergence concepts, laws of large numbers, central limit theorems, Monte Carlo simulation; (2) statistics: sampling statistics, sufficiency, exponential families of distributions. Further topics in statistics will be considered in Economics 520.

520 **Econometrics II** Spring. 4 credits. Prerequisite: Economics 519. This course is a continuation of Economics 519 (Econometrics I) covering (1) statistics: estimation theory, least squares methods, method of maximum likelihood, generalized method of moments, theory of hypothesis testing, asymptotic test theory, and nonnested hypothesis testing and (2) econometrics: the general linear model, generalized least squares, specification tests, instrumental variables, dynamic regression models, linear simultaneous equation models, nonlinear models, and applications.

523 **American Economic History** Fall. 4 credits. For description see Economics 323.

524 **American Economic History** Spring. 4 credits. For description see Economics 324.

525 **Economic History of Latin America** Fall. 4 credits. For description see Economics 325.

526 **Public Finance: Resource Allocation and Fiscal Policy** Fall. 4 credits. For description see Economics 335.

535 **Public Finance: Resource Allocation and Fiscal Policy** Fall. 4 credits. For description see Economics 336.

536 **Public Finance: Resource Allocation and Fiscal Policy** Spring. 4 credits. For description see Economics 336.

551 **Industrial Organization** Fall. 4 credits. For description see Economics 351.

552 **Public Regulation of Business** Spring. 4 credits. For description see Economics 352.

554 **Economics of Regulation** 4 credits. For description see Economics 354.

555 **Politics and Markets** Fall. 4 credits. For description see Economics 355.

557 **Economics of Imperfect Information** Fall. 4 credits. Prerequisites: Economics 509 and statistics. The purpose of the course is to consider some major topics in the economics of uncertain information. Although the precise topics considered will vary from year to year, subjects such as markets with asymmetric information, signaling theory, sequential choice theory, and search theory will be discussed.

561 **International Trade Theory and Policy** Fall. 4 credits. For description see Economics 361.

562 **International Monetary Theory and Policy** Spring. 4 credits. For description see Economics 362.

565 **Economic Problems of Latin America** Spring. 4 credits.

567 **Comparative Economic Systems: Soviet Union and Europe** Fall. 4 credits. For description see Economics 367.

569 **Selected Topics in Socialist Economies: China** Spring. 4 credits. For description see Economics 369.

571 **Economic Development** Spring. 4 credits. For description see Economics 371.

572 **Applied Economic Development** Spring. 4 credits. For description see Economics 372.

573 **International Specialization and Economic Development** Spring. 4 credits. For description see Economics 373.

578 **Economics, Population, and Development** Fall. 4 credits. For description see Economics 378.

581 **Economics of Participation and Worker Management** Fall. 4 credits. For description see Economics 381.

582 **The Practice and Implementation of Self-Management** Fall. 4 credits. For description see Economics 382.

599 **Readings in Economics** Fall or spring. Variable credit. Independent study.

603 **Seminar in Peace Science** Fall. 4 credits. Among topics to be covered at an advanced level are game theory, coalition theory, bargaining and negotiation processes, cooperative procedures, microbehavior models, macrosocial processes, and general systems analysis.

605 **Advanced Social Theory for Peace Scientists** Spring. 4 credits. Prerequisites: Economics 505 and knowledge of microeconomic theory. Study of diverse social science hypotheses and theories as they relate to, and can be synthesized within, multiregional, multinational, and generally multigroup conflict and cooperative frameworks. Particular attention will be given to developments stemming from microeconomics and general systems theory. Dynamic analyses will be emphasized.

610 **Stochastic Economics: Concepts and Techniques** Spring. 4 credits. Prerequisites: Economics 509, 510, 513, 514, 519, and 520. This course will review a number of techniques that have been useful in developing stochastic models of economic behavior. Among those are (a) discrete-time Markov processes, (b) dynamic programming under uncertainty, and (c) continuous-time diffusion processes. Examples of economic models will be drawn from recent literature on optimal capital accumulation and optimal savings and portfolio selection problems, permanent income hypothesis, dynamic models of price adjustment, etc. Advanced graduate students contemplating work in economic theory and econometric theory will be able to get some exposure to current research.

611 **Advanced Microeconomic Theory** Fall. 4 credits.

612 **Advanced Macroeconomic Theory** Fall. 4 credits.

617 **Mathematical Economics** Fall. 4 credits.

618 **Mathematical Economics** Spring. 4 credits.

619 **Advanced Topics in Econometrics I** Fall. 4 credits. Prerequisites: Economics 519–520 or permission of instructor. Advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference, advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference, advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference, advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference, advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference, advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference, advanced topics in econometrics, such as asymptotic estimation and test theory; robust estimation; Bayesian inference.

620 **Advanced Topics in Econometrics II** Spring. 4 credits. Prerequisites: Economics 519–520 or permission of instructor. For description see Economics 619.

623 **American Economic History** Fall. 4 credits.

624 **American Economic History** Spring. 4 credits.

625 **Methods in Economic History** Spring. 4 credits.

631 **Monetary Theory and Policy** Fall. 4 credits.

632 **Monetary Theory and Policy** Spring. 4 credits.

635 **Public Finance: Resource Allocation and Fiscal Policy** Fall. 4 credits.

636 **Public Finance: Resource Allocation and Fiscal Policy** Spring. 4 credits.

637 **Location Theory and Regional Analysis** Fall. 4 credits. Prerequisites: Economics 509 and 517 and Econometrics. Economic principles influencing the location of economic activity, its spatial equilibrium structure, and dynamic forces. Topics include spatial pricing policies, price competition, and relocation by firms; residential location patterns; patterns of regional growth and decline; and patterns of urbanization.

638 **Public Finance: Local Government and Urban Structure** Fall. 4 credits. An integration of urban economics and location theory with local public goods and state and local public finance topics. Both equilibrium models and dynamic analyses are explored.

641 **Seminar in Labor Economics** Fall. 4 credits.

642 **Seminar in Labor Economics** Spring. 4 credits.

644 **The Labor Market and Public Policy: A Comparative View** Spring. 4 credits.

647 **Economics of Evaluation (also Industrial and Labor Relations 647)** Spring. 4 credits. For description see Industrial and Labor Relations 647.
648 Issues in Latin America  Spring. 4 credits.

651 Industrial Organization and Regulation  Fall. 4 credits.

652 Industrial Organization and Regulation  Spring. 4 credits.

653 Public Policy Issues for Industrial Organizations  Spring. 4 credits. Prerequisites: Economics 509, 510, and 651.

661 International Economics: Pure Theory and Policy  Fall. 4 credits.

662 Seminar in International Economics  Spring. 4 credits. Prerequisites: Economics 661, acquaintance with conventional trade analysis, or permission of instructor.

664 International Economics: Balance of Payments and International Finance  Spring. 4 credits.

670 Economic Demography and Development  Fall. 4 credits.

671 Economics of Development  Spring. 4 credits.

672 Economics of Development  Fall. 4 credits.

673 Economic Development  Spring. 4 credits. Prerequisites: Economics 509 and 520.

674 Economic Systems  Spring. 4 credits.

678 Economic Growth in Southeast Asia  Spring. 4 credits.

679 Theory of Quantitative Economic Policy  Spring. 4 credits.

681 Economics of Participation and Self-Management  Fall. 4 credits.

682 Seminar on Economics of Participation and Labor-managed Systems  Fall. 4 credits.

684 Seminars in Advanced Economics  Fall and spring. 4 credits.

English


Visiting professors and postdoctoral fellows: R. Harbison, A. Kazin, M. Koch, J. Weich

The Department of English offers a wide range of courses in English and American literature as well as in creative writing and expository prose. Literature courses focus upon major works, texts, on study of particular authors and genres, and on the relationship of literary works to their historical periods, and on questions of critical theory and method. The department not only stresses the development of analytical reading and lucid writing but, through the study of major literary texts, teaches students to think about the nature and value of human experience.

Students who major in English develop their own programs of study in consultation with their advisers. Some focus on a particular historical period or major literary genre (poetry, drama, or the novel). Others pursue special interests in areas such as women's literature or creative writing. Students may also concentrate in medieval studies or American studies.

The Major

Any student considering a major in English should make an appointment to see the department's director of undergraduate studies to discuss the major and be assigned a major adviser. Copies of a brochure containing suggestions for English majors and prospective English majors are available in the department office, 250 Goldwin Smith Hall.

The Department of English requires its students to prepare themselves for the major by taking at least one of the following prerequisite courses: The Reading of Fiction (English 270), The Reading of Poetry (English 271), Introduction to Drama (English 272), The American Literary Tradition (English 275, 276), or Creative Writing (either English 280 or 281). These courses are basic to the English major and to much other academic work: responsive, sensitive reading and lucid, effective writing. English 270, 271, and 272, which may be used to satisfy the freshman writing seminar, are open to all second- and third-term freshmen. First-term freshmen with a score of 700 or above on the CEEB College Placement Tests in English composition or literature or 4 or 5 in the CEEB Advanced Placement Examination in English may also enroll in English 270, 271, and 272 as space permits, and students interested in majoring in English are especially encouraged to do so.

English majors are required to complete six credits of foreign language study (preferably in literature) in courses for which qualification is a prerequisite. Advanced placement credit does not fulfill this requirement, nor does the study of foreign literature in translation. Majors are urged to complete this requirement by the end of their sophomore year, and those who enter Cornell without sufficient preparation should begin their language study at once.

English 201 and 202, a survey of major British writers, though not required for the major, are strongly recommended for majors and prospective majors, since they afford an overview of the history of English literature, providing an introduction to periods, authors, and genres that allow students to make a more informed choice of advanced courses.

Besides taking at least one of the prerequisite courses and fulfilling the department's foreign language requirement, each English major must complete with passing letter grades at least 36 credits in courses approved for the major. Courses approved for the major include English 201, English 202, and all English courses numbered 300 or above. In addition to English 201 and 202, students may count up to two courses for the major from the category entitled "200-level Courses Approved for the Major." Courses taken for the major in English have recently modified its major requirements, two separate sets of requirements apply to courses taken to fulfill the 36 credits for the major, as outlined below. Further information on both sets of requirements appears in a brochure entitled The English Major, available in Goldwin Smith 250.

Students in the class of 1988 and in preceding classes must take at least eight of the 36 credits required for the major in English and American literature written before 1800. These students may count toward the major as many as three courses numbered 300 or above in foreign literature, in comparative literature, or in special courses such as those sponsored by the Society for the Humanities, if such courses are approved by their advisers as relevant to the major.

Students in the class of 1989 and in subsequent classes must fulfill breadth and concentration requirements as follows:

A. Breadth requirement. Students must take at least three courses in English and American literature before 1800 and at least three courses in English and American literature after 1800.

B. Concentration requirement. Students must complete a concentration of from three to six courses in one of the following areas:


2) A major literary genre:

3) A major literary genre: poetry, drama, prose fiction

4) Creative writing

5) Any other significant grouping of English courses if approved by the student's major adviser and the director of undergraduate studies in English.

A single course may count towards more than one requirement: a course in Shakespeare, for instance, counts toward the pre-1800 requirement and toward concentrations in drama or in Renaissance literature. In fulfilling these requirements, students should plan their coursework toward the English major a maximum of 12 credits in literature and creative writing courses at the 300-level or above given by such departments and programs as Comparative Literature, Theater Arts, modern languages, the Africana Studies and Research Center, and the society for the humanities. In addition, double majors may count toward the English major courses taken in their other major if such courses are approved by their English department adviser as relevant to the study of literature.

Honors. Prospective candidates for the degree of Bachelor of Arts with honors in English should consult the chairperson of the Honors Committee during the spring term of their sophomore year or early in their junior year. Honors candidates will take one or two honors seminars (English 491 or 492) during their junior year. Honors candidates will take one or two honors seminars (English 491 or 492) during their junior year. Honors seminars (English 491 or 492) are offered by such departments and programs as Comparative Literature, Theater Arts, modern languages, the Africana Studies and Research Center, and the society for the humanities. In addition, double majors may count toward the English major courses taken in their other major if such courses are approved by their English department adviser as relevant to the study of literature.

Courses for Nonmajors

For students not majoring in English, the department makes available a variety of courses at all levels. Some courses at the 200 level are open to qualified freshmen, and all of them are open to sophomores. Courses at the
300 level are open to juniors and seniors and to underclass students with permission of the instructor. The suitability of courses at the 400 and 600 levels for nonmajors will vary from topic to topic, and permission of the instructor is required.

Courses for Freshmen
As part of the Freshman Seminar Program, the Department of English offers many one-semester courses concerned with various forms of writing (narrative, biographical, or expository), with the study of specific areas in English and American literature, and with the relation of literature to culture. Students may elect any two of these courses during their first year to satisfy the Freshman Seminar requirement. Descriptions of Freshman Seminar offerings may be found in the Freshman Seminar Program listings in the section "Special Programs and Interdisciplinary Studies."

Courses for Sophomores
Although courses numbered in the 200s are primarily for sophomores, some of them are open to qualified freshmen and to upperclass students. Courses approved for the major are English 201 and 202 and all courses numbered 200 or above except English 496. In addition to English 201–202, students may count up to two 200-level courses toward the major from "Courses Approved for the Major," listed below.

201–202 The English Literary Tradition
201, fall; 202, spring. 4 credits each term. Open to all undergraduates. English 201 is not a prerequisite to 202. May be counted toward the English major.
M W F 11:15. Fall: M. A. Radzinowicz; spring: M. Abrams, P Sawyer.
Interpretation of major works ranging from Beowulf through Yeats. English 201 surveys Old English poetry, Chaucer, medieval romances, Spenser, Shakespeare, Donne, and Milton. English 202 includes Dryden, Swift, Pope, Samuel Johnson, Blake, Jane Austen, the major Romanticists, and Victorian poets. The course will be conducted as a combination of lectures and intensive seminars in special topics.

Courses Primarily for Nonmajors
205–206 Readings in English and American Literature
205, spring; 206, fall. 3 credits each term. Open to all undergraduates. English 206 is not a prerequisite to 202.
Covers literature since the mid-nineteenth century. Novels by such authors as Emily Bronte, Conrad, Hardy, Hemingway, Faulkner, Vonnegut, and others; poems by Browning, Housman, and Frost; and plays by Shaw and one or two contemporary writers such as Arthur Miller. Two lectures and one discussion section each week. Two short papers, two prelims, no final examination.
An introduction to some of the major texts from the beginning through the eighteenth century. The first week will be devoted to Beowulf and two of Chaucer's Canterbury Tales as samples of early yet readily understandable literature. Readings from other authors include Shakespeare, Jonson, Marlowe, Donne, Pope, Swift, and Johnson.

208 Forms of Poetry
Spring. 3 credits.
M W F 11:15. D. Fred.
This is an introductory course for which no previous literary training is assumed. The aim of the course is to develop the students' skills in reading and talking about poetry through the close study of a wide range of short poems. Inquiring into the implications of Wallace Stevens's claim that "all poetry is experimental poetry," we will explore how poets make rules for themselves in order to break them and create poetic traditions by transgressing against traditional forms. Not a historical survey. Forms of Poetry will group poems according to the poetic devices and formal patterns they share. From time to time throughout the course, questions of poetic form will be studied through analogues from painting, architecture, and popular culture. Poets to be read include Shakespeare, Herbert, Pope, Blake, Keats, Poe, Whitman, Dickinson, Frost, Williams, Bishop, Merwin, and Ammons. Requirements: two brief (two to three pages) papers, an oral report, four short ungraded exercises, an in-class midterm examination, and a final examination.

210 Medieval Romance: The Voyage to the Otherworld
Spring. 3 credits.
M W F 11:15. T. Hill.
The course will survey some representative medieval narratives concerned with voyages to the otherworld or with the impinging of the otherworld on ordinary experience. The syllabus will normally include some representative Old Irish otherworld literature; selections from the Mabinogion; selections from the Lais of Marie de France; Chretien de Troyes's Erec, Yvain, and Lancelot; and the Middle English Sir Orfeo and Sir Gawain and the Green Knight. We will finish by looking at a few later otherworld romances, such as selections from Spenser's The Faerie Queene, Keats's La Belle Dame sans Merci, and Tolkien. All readings will be in modern English. Requirements: three brief (two to three typed pages) papers and a final exam designed to test the students' reading.

227 Shakespeare
3 credits. Each section limited to 25 students.
A critical study of representative plays from the principal periods of Shakespeare's career.

286 Writing in the Humanities (also Writing 201)
Fall or spring. 3 credits. Sections limited to 17 students. Corequisite: enrollment in another course in the humanities or expressive arts. Carries distribution credit as English 286. S-U grades with permission of instructor.
This course helps students strengthen writing skills valuable in all disciplines and particularly appropriate to the humanities. It also encourages them to ask what they are doing when they read, interpret, and write about works of literature, philosophy, history, and the visual arts. Using such materials, the course takes up problems of technique in writing (audience, organization, critical method, use of secondary materials) and explores questions to which they point: How does this good critical and interpretive writing shape as well as find its subject matter and audience? How does commentary change as we read different versions of the same text? What counts as knowledge in these domains, and how is it formed by the media of its expression? What relevance to our study have historical data and theoretical speculation? Students in the course will write (and often revise) roughly thirty pages (eight to ten papers) and confer often with the instructor.
Fall: M W F 11:15. S. Davis. Spring: hours to be arranged.
The course begins with works that provide commentary by challenging our understanding and moves on to works that pit literary, philosophical, or historical understanding against its real or supposed antagonists: alien humanity, artistic inspiration, madness, the divine, and the will to power. Readings and viewings may include paintings by da Vinci and Velasquez, Nabokov's Pale Fire, Conrad's Heart of Darkness, Plato's Gorgias, Nietzsche's Birth of Tragedy, Euripides' The Bacchae, and Peter Weiss's Marat/Sade, the play and the film.
Fall: M W F 12:20, S. Siskin. Spring: hours to be arranged.
This section of the course will focus on play as a source of inspiration as well as a mode of argument and understanding in such areas as literature, philosophy, and film. We will look at humans having fun (or wrestling) with ideas and ideology, with the conventions of their medium, and with their audience and the work of other humanists. Readings and viewings will include artworks of Escher and Uccello, Berger's Ways of Seeing, Plato's Protagoras, excerpts from Chaucer's Canterbury Tales, essays by the historian Richard Cobb, Shelley's Frankenstein, and the Frankenstein films with Boris Karloff and Gene Wilder.

288–289 Expository Writing
288, fall; 289, spring. 3 credits each term. Each section limited to 18 students.
Fall: M W 9:05, 11:15; or 12:20-1:10; or T R 11:15 or 1:25, plus conferences to be arranged. N. Kaplan and staff. Spring: Hours to be arranged. R. Farrell, A. Boehm, and staff.
This course is intended to meet the needs of undergraduates from a range of disciplines who wish to gain skill in expository writing. Under the instructor's direction, students will write on topics related to their own interests. A substantial amount of new writing or a revision of an earlier essay will be expected each week. Since the class is the primary audience for the essay, attendance and participation in discussion by all students are essential. In addition to regularly scheduled class meetings, instructors will hold frequent conferences with students.

200-Level Courses Approved for the Major
Students may take up to two of the following courses for credit toward the English major.

209 The American Short Story

247 Major Nineteenth-Century Women Novelists (also Women's Studies 248)

251 Twentieth-Century Women Novelists (also Women's Studies 251)

253 The Modern Novel
Fall. 4 credits.
"In or about December 1910," Virginia Woolf wrote, "human character changed." The change may have been neither as sudden nor as drastic as Woolf (playfully) claimed, but novelists in writing what we now call the modern period—roughly between the turn of the twentieth century and the end of World War I—did seem convinced that their culture was markedly different from the culture of the nineteenth century and that this difference affected both "human character" and the kind of writing that could best represent such altered concepts of humanity. This course will examine a number of English, European, and American works that illustrate the scope and diversity of the modern novel. Writers include Conrad, Forster, Hesse, Woolf, Joyce, Hurston, Sarre, Ryhs, and Ellison.

273 Irish Culture
Fall. 4 credits.
An interdisciplinary survey of Irish culture from earliest times to the present. Topics include medieval literature and mythology, early Irish social life, land and agriculture, the Irish language, the visual arts, the decline of the Gaelic order, and the corresponding rise of the Anglo-Irish ascendancy. The modern literary revival will receive particular attention, and major works by Yeats, Synge, Joyce, O'Casey, and others will be studied in relation to historical and political developments from the Young Ireland movement of the 1840s to the revolution and civil war of 1916–23. The course will conclude with a consideration of post-revolutionary literature and the continuing Ulster crisis. Extensive video materials supplement the readings. No prerequisites.

277 Folklore and Literature
Fall. 4 credits. Not offered 1987–88.
290 Literature and Value Spring. 4 credits.
Each week a different member of the faculty discusses a poem, group of poems, story, play, or novel that is of particular importance to him or her—perhaps as a work that contributed to the development of a particular theme or a work that challenges the student to develop a lifetime to the study of literature or to the writing of fiction or verse, perhaps as a work that has affinity with present-day concerns. In a following meeting that week, class members will discuss, sometimes with the guest faculty member present, their responses to that work. Students will be encouraged to explore, in their papers for the course as well as their discussions, the relation between specific texts and their own experience, attitudes, and values.

Courses that Satisfy the Major Prerequisite

270 The Reading of Fiction Fall or spring. 3 credits. Each section limited to 17 students. Recommended for prospective majors in English. Open to all students. Upperclass students admitted as space permits. May be used to satisfy either the freshman writing seminar requirement or the distribution requirement in the humanities, but not both.
Forms of modern fiction, with emphasis on the short story and novel. Critical study of works by English, American, and Continental writers from 1880 to the present—Bellow, Chekhov, Conrad, Faulkner, Joyce, Mann, Kafka, and others.

271 The Reading of Poetry Fall or spring. 3 credits. Each section limited to 17 students. Recommended for prospective majors in English. Open to all students. Upperclass students admitted as space permits. May be used to satisfy either the freshman writing seminar requirement or the distribution requirement in the humanities, but not both.
Fall: M W F 10:10, T R 8:40–9:55, G. Teskey; Spring: Hours to be arranged. R. Bogel, S. Siegel, P. Parrish. Designed to sharpen the student's ability to understand and respond to poetry. Readings in the major periods, modes, and genres of poetry written in English.

272 Introduction to Drama Fall or spring. 3 credits. Each section limited to 17 students. Recommended for prospective majors in English. Open to all students. Upperclass students admitted as space permits. May be used to satisfy either the freshman writing seminar requirement or the distribution requirement in the humanities, but not both.
Fall: M W F 10:10, T R 8:40–9:55, M. Teskey; Spring: Hours to be arranged. S. Saccamano, S. Davis, and staff.
Selected masterworks by such playwrights as Sophocles, Ibsen, and Shaw introduce the chief idioms and styles of the Western dramatic tradition. The course work will consist of discussions and papers as well as a special project of some plays being produced by the Department of Theatre Arts. The course will be taught in small sections.

275 The American Literary Tradition Fall or spring. 2 credits. Recommended for prospective majors in American studies.
The problem of an American national literature is explored through the reading, discussion, and close analysis of texts representing the four principal periods in American literary history. Not a survey, this course focuses on the relations of the texts to each other, the role of Americanness in those relationships, and the assumptions about history and language with which critical appreciation must engage. Works by such writers as Franklin, Hawthorne, Tawn, Stephen Crane, Wharton, James, Fitzgerald, Howells, Wright, and Doctorow.

276 The American Literary Tradition Spring. 3 credits. Recommended for prospective majors in American studies.
The problem of an American national literary tradition is explored through discussion, and close analysis of texts representing the four principal periods in American literary history. Not a survey, this course focuses on the relations of the texts to each other, the role of Americanness in those relationships, and the assumptions about history and language with which critical appreciation must engage. Works by such writers as Franklin, Hawthorne, Stephen Crane, Wharton, James, Fitzgerald, and Gaylord.

280–281 Creative Writing 280, fall; 281, spring. 3 credits each term. Each section limited to 18 students. Recommended for prospective majors in English.
Hours to be arranged. Fall: R. Morgan, P. Janowitz, S. Vaughn, R. Harbison, A. Boehm, and staff. Spring: S. Vaughn, M. Koh, L. Herrin, and staff.
An introductory course in the theory and practice of writing narrative prose, poetry, and allied forms.

Courses for Sophomores, Juniors, and Seniors

Courses at the 300 level are open to juniors and seniors and to others with the permission of the instructor. There are no specific prerequisites except as noted for English 382–383 and 384–385.

302 Literature and Theory (also Comparative Literature 302) Not offered 1987–88.

313 Middle English Literature in Translation Spring. 4 credits.
Readings from Middle English literature in translation, excluding Chaucer. Though texts vary, a typical selection would be Arthurian romances such as Layamon's Brut, the Alliterative Morte Arthure, Sir Gawain and the Green Knight, and Malory's Morte d'Arthur; Middle English lyrics and plays; and major poets such as Petr Poeman and The Pearl, the other works of the Gawain-poet, Gower's Confesso Amanis, The Owl and the Nightingale, and The Land of Cokayne.

319 Chaucer Spring. 4 credits.
The course will center on a close reading of the major works of Geoffrey Chaucer, including The Canterbury Tales and some of the minor works. Students will be given ample opportunity to learn Chaucer's language, so that all dimensions of the poems will be available to them. Prior knowledge of Middle English is neither expected nor required; course participants will be encouraged to follow up their own interests in class reports and papers.

320 The Sixteenth Century: Tudor Culture Fall. 4 credits. Offered alternate years.
M W F 1:25. C. Levy.
The development of English as an imaginative and persuasive medium, from Wyatt and Ascham through Sidney, Spenser, Marlowe, Shakespeare (the nonrational verse), and Hooker. Consideration in particular of lyric verse, pastoral, epic, and epophy; prosopagnosics and rhetorical doctrine; and such early prose fiction as that of Greene, Lodge, and Nashe. Some attention to Elizabethan drama other than Shakespearean and a brief excursion into late Elizabethan counterculture.

321 Spenser and Malory Spring. 4 credits.
Prereq: Readings including half of Malory's Morte d'Arthur and half of Spenser's Faerie Queene. Chetham's romances and some of Spenser's minor poems will be mentioned occasionally as background.
Comparisons will assess possible literary influence, the distinctive genius of each author as a writer of romance, and the development of Arthurian romance from the Middle Ages to the Renaissance. Informal lecture and discussion. Two papers, no exams.

322 The Seventeenth Century Spring. 4 credits.
The main traditions in poetry with emphasis on John Donne, Ben Jonson, Andrew Marvell, and the Restoration plays. The development of prose in prose of Bacon, Burton, Browne, Walton, and Bunyan and of the King James version of the Bible: prose style; and popular prose forms: essay, character, letter, and biography.

327 Shakespeare Fall. 4 credits.
M W F 9:05. A. Caputi.
An introduction to the works of Shakespeare based on a selection of plays representative of the stages of his artistic development and the range of his achievement.

329 Milton Spring. 4 credits.
An introduction to the poetry of John Milton.


333 The Eighteenth-Century English Novel Fall or spring. 4 credits.
The rise of the English novel. We will place the emergence of the novel as a dominant literary genre in the context of the intellectual and cultural developments in eighteenth-century England and will discuss what the novel's changing form can tell us about the nature of fiction and the problems of representation. Novels by Defoe, Richardson, Fielding, Smollett, Sterne, MacKenzie, and Burney.

340 The English Romantic Period Fall. 4 credits.
M W F 11:15. R. Parker.
Readings in verse and prose by major writers, including Blake, Burke, Coleridge, Wordsworth, Byron, Shelley, and Keats, with some attention to related letters and critical writings of the period. Additional readings in related figures such as Wollstonecraft, Radcliffe, Hazlitt, Mary Shelley, and DeQuincey. The chief concern of the course will be to study these writers in their cultural context through emphasis on such topics as the French Revolution, narrative and lyric representation, and the development of a new literary influence and originality, and theories of the imagination.

345 The Victorian Period Fall. 4 credits.
The Victorian age was a period of turbulence and uncertainty much like our own. The extremes of wealth and poverty created by the factory system, the challenges to religious belief, and the advances of science stimulated people to rethink basic questions—How should I live? What can I hope for?—and to seek answers in a flourishing literary culture. Readings will include the poetry of Tennyson, Browning, and Arnold; two novels, Great Expectations and Middlemarch; one play, The Importance of Being Ernest; and selections from Carlyle, Ruskin, Darwin, and others.

348 The Female Literary Tradition: Wollstonecraft to Woolf (also Women's Studies 348) Spring. 4 credits.
A survey of the (mainly British) female literary tradition from the French Revolution to early twentieth-century modernism. The course will trace the dual legacies of romanticism and republicanism and their monstrous and gothic forms, exploring their repressed presence in Victorian women's fiction until they surface again in the writing of the 1948 revolution and after. As well as the social history of literature, it will examine Victorian women's writing in the context of the female uncanny, through which Victorian women writers confront their inner worlds, before turning to the emergence of the
"new woman" and utopian women’s fiction at the end of the nineteenth century and to the beginnings of the twentieth-century modernist experiment by women. Texts will include works by Wollstonecraft, Austen, Mary Shelley, Emily and Charlotte Bronte, Eliot, Barrett Browning, Gaskell, Gilman, Schreiner, and Wolff.

350 The Early Twentieth Century (to 1930) Spring 4 credits. M W F 10:10. R. Harbison. Critical study of major works by Hardy, Conrad, Lawrence, Joyce, Woolf, Eliot, Yeats, Hopkins, Wilde, and others. While the emphasis will be on close reading of individual works, some attention will be made to place the authors and works within the context of literary and intellectual history. The course will seek to define the development of literary modernism in England by reference to these authors’ innovations in themes and techniques.

[351 Modern Literature since 1914 4 credits. Not offered 1987–88.]

[353 Postcolonial Literatures 4 credits. Not offered 1987–88.]


363 The Age of Realism and Naturalism Fall 4 credits. T R 10:10. M. Seltzer. The literary expression of new attitudes toward American society and culture between the Civil War and the early years of the twentieth century. We will read representative works by writers such as Mark Twain, W. D. Howells, Henry James, Edith Wharton, Stephen Crane, Kate Chopin, and Theodore Dreiser.

364 American Literature between the Wars Spring 4 credits. M W F 9:05. J. Bishop. This course will alternate yearly with English 365, which surveys American literature since 1945. It will accordingly be concerned with a sequence of works to illustrate different aspects of American literature in the years between the First and the Second World Wars. Poetry may be represented by T. S. Eliot, Wallace Stevens, and W. C. Williams; prose fiction, by Sinclair Lewis, Fitzgerald, Faulkner, Dos Passos, Richard Wright, and Mary McCarthy; and nonfictional prose, by Agee and Edmund Wilson. The texts will be chosen to exemplify the first response of Americans to the pressure of modernity through this exceptionally creative period in our culture.

[365 American Literature since 1945 4 credits. Not offered 1987–88.]


368 The Contemporary American Novel Spring 4 credits. Prerequisite: one previous 300- or 400-level literature course or permission of instructor. M W F 1:25. M. Hite. This course examines a selection of the most influential—and arguably the most difficult—American novels written in the postwar period, including works by Kerouac, Farina, Pynchon, Walker, Hawkes, Didion, Morrison, and Heller. Extensive writing (eight to ten short papers) and class participation are required.

371 American Poetry from Emerson to Stevens Fall 4 credits. T R 1:25–2:40. J. Porte. A critical examination of the American poetic tradition as it evolves from Emerson. Particular attention will be paid to the development of new modalities of verse out of the English tradition and to theories of poetry. Other writers to be considered will include Walt Whitman, Emily Dickinson, Robert Frost, Ezra Pound, William Carlos Williams, Marianne Moore, T. S. Eliot, and Hart Crane.

373 Postwar American Poetry Spring 4 credits. T R 1:25–2:40. L. Herrin. A study of the art of poetry in the United States since World War II. We will focus on broad trends and currents and on individual figures whose distinctive voices transcend issues of "period style." To this end we will read both intensively in the work of eight major poets—Robert Lowell, Elizabeth Bishop, Sylvia Plath, W. S. Merwin, Adrienne Rich, A. R. Ammons, James Merrill, and John Ashbery—and extensively in an anthology of contemporary American poetry. Some attention will be paid to the various loosely defined "schools" and movements of the past thirty years (e.g., Beat, Black Mountain, Deep Image). In addition we will examine what is at stake in the construction of a canon that places a few poets at the center and relegates others to the periphery. Students will be asked to familiarize themselves with the work and development of at least one poet beyond the primary eight and to report on their reading to the class. At the end of the semester an attempt will be made to survey important work being done by poets still in their thirties and forties—work that by virtue of its freshness is especially difficult to classify and evaluate.

374 The American Prophetic Books Spring 4 credits. T R 2:30–3:45. A. Kazin. Public lectures on American masterpieces selected from the literary, political, and religious literature of the United States. These will begin with the Declaration of Independence and with contemporary American fiction, poetry, and polemics. The course will include European assessments of the "American experiment," notably Foucault’s Democracy in America.

381 Reading as Writing Fall 4 credits. Limited to 15 students by permission of the instructor, normally on the basis of a writing sample submitted in advance. T R 1:25–2:40. L. Fukundji. A course in writing about literary texts from a range of genres including, but not necessarily limited to, the epic, the satire, the novel, and the essay; for English majors or nonmajors who have enjoyed and done well in 380-281 previously. Prerequisite: permission of instructor, normally on the basis of a manuscript. Fall: M W 2:30, L. Herrin; M W 1:25, D. McCall; plus conferences to be arranged. Spring: L. Herrin, D. McCall, J. Welch.

[382-383 Narrative Writing 382, fall; 383, spring. 4 credits each term. Each section limited to 15 students. Prerequisites: English 280 and 281 and permission of instructor. Fall: M W 2:30–4:25, R. Morgan; T R 2:30–4:25, A. Ammons. Spring: T R 2:30–3:45, K. McClane; W 2:30–4:25, P. Janowitz.]

The writing of fiction; study of models; analysis of students’ work.

384–385 Verse Writing 384, fall or summer; 385, spring or summer. Limited to 15 students. Prerequisites: permission of instructor. Interested students should submit a writing sample to the appropriate professor before the beginning of the term. Fall: T R 11:40 (and conferences to be arranged), S. Davis. Spring: T R 12:00–L. Fukundji. (and conferences to be arranged). For both English majors and nonmajors who have done well in freshman writing seminars and in such courses as English 288–289 and 286 and who desire intensive practice in writing essays. Particular, but not exclusive, emphasis on expository techniques of analysis and persuasion with special attention to relations between voice and purpose.

Courses for Advanced Undergraduates

Enrollment in courses at the 400 level is limited by prerequisite or permission of the instructor.


411 Introduction to Old English (also English 611) Fall 4 credits. M W F 12:20. T. Hill. The aim of the course is to teach students to read Old English as accurately and fluently as possible. While the primary emphasis is on acquiring a reading
knowledge of the language, we will also be concerned with the linguistic and literary problems presented by the texts we cover.

412 Beowulf (also English 612) Spring. 4 credits. M.W.F. 1:25, T. Hill.
A close reading of Beowulf. Attention will be given to relevant linguistic and literary problems.

414 The Middle English Lyric and the European Tradition (also English 614) Fall. 4 credits. Open to graduate students and qualified undergraduates. Recommended knowledge of one Romance language. M.W.F. 10:00-11:00, T. G. Hiltz.
A survey of the Middle English lyric with emphasis on its relationship to the continental European lyric tradition.

[415 The English Language 4 credits. Not offered 1987–88.]

[418 Studies in Chaucer (also English 618) 4 credits. Not offered 1987–88.]

[422 Renaissance Narrative 4 credits. Not offered 1987–88.]


[424 Lyric Sequences (also English 624) 4 credits. Not offered 1987–88.]

427 Studies in Shakespeare: Shakespeare and Chekhov Fall. 4 credits.
TR 2:55–4:10, E. Fogel.
We will examine what Shakespeare and Chekhov have in common, and how they differ, as to their modes of dramatic construction, their theatrical effects, and their treatment of human experience. The texts to be examined are Hamlet, The Sea Gull, Twelfth Night, King Lear, The Cherry Orchard, and The Tempest. Students will write one long paper (five pages) and one longer paper (ten pages). The class will be run with a seminar-style oral reports and ensuing discussions.

427 Studies in Shakespeare: Tragedy and Psychoanalysis Spring. 4 credits. Prerequisite: prior course work in either Shakespeare or psychoanalysis. Enrollment limited to 15 students.
TR 1:25–2:40, T. Murray.
The course will study five tragedies by Shakespeare: Hamlet, Othello, King Lear, Macbeth, and Antony and Cleopatra. These texts will be analyzed in relation to two fields of contemporary inquiry: psychoanalysis and the theory of tragedy. Why do tragedies attract the interest of psychoanalytical theorists and critics? If this appeal can be attributed to the nature of tragedy itself, why are Shakespeare's tragedies so often coupled with Sophocles' Oedipus Rex as the models for psychoanalytical theory? Can we identify particular structural and thematic features of Shakespearean tragedy that foreshadow significant issues in Freud, Lacan, and their rereadings by feminists? In addressing this question, the seminar will read short selections in the psychoanalysis of tragedy by theorists from several fields (literary criticism and theory, anthropology, linguistics) in an effort to understand satire as a literary, psychological, and cultural phenomenon. Literary texts will be drawn primarily from the eighteenth century—especially works of Swift, Pope, Fielding, and Gray—though we will also study earlier and more recent satires, including caricatures and satiric cartoons from the contemporary press. The course will be conducted as a discussion.

[432 Dr. Samuel Johnson (also English 632) Spring. 4 credits. Not offered 1987–88.]

435 The Eighteenth-Century Sublime (also English 638) Fall. 4 credits.
TR 1:25–2:40, N. Saccamano.
This course will introduce students to the poetry of the eighteenth century by focusing on the sublimes as a dominant aesthetic, through readings of both critical works and verse, the course will analyze the development of the sublime from an elevated style of poetic writing in neoclassicism to the expression of an experience of transcendence in the poetry at the end of the century. Topics will include the relation of the sublime to the grotesque; the role of passion, vision, and prophecy in poetry; the institution of genius; and the political and religious significance of the sublime as an experience of liberation. Authors read include Longinus, Addison, Pope, Collins, Burke, Young, Gray, and Wordsworth.

[441 Wordsworth and Keats Spring. 4 credits. Not offered 1987–88.]


[447 The Last Victorians 4 credits. Not offered 1987–88.]

449 (also Society for the Humanities 412) The Self and the Colonial Encounter: Kipling and Conrad Spring. 4 credits.
TR 1:25–3:40, 15 students.
Drawing on two writers whose work is deeply informed by their colonial encounters, this course will explore how an understanding of the self is dependent on the way we understand our social and political world—specifically, how notions of the self are articulated in literary works and forms and how they reflect and refract tensions and movements of an imperialist culture. Basic readings on notions of the self, drawn from psychoanalysis and feminism (Freud, Chodorow, Irigaray), anthropology (Mauss, Geertz), "discourse" theory (Foucault, Greenblatt), and film studies (Mulvey, Heath). Literary texts include The Portable Kipling and Kim and Conrad's Heart of Darkness and Lord Jim. Relevant historical writings by James Mill, Cecil Rhodes, Lord Macaulay, and Charles Grant.

450 The History of the Book Fall. 4 credits.
Limited to 20 students. Prerequisite: permission of instructor.
T 7–9 p.m., D. Eddy.
A study of the physical aspect of books printed during the last six centuries. Included are papermaking, typography and printing, bookbinding, and the history of book illustrations; the transmission of texts and bibliographical descriptions of hand-printed and modern trade books. Above all, this is the study of the book as a work of art.

452 South African Literature and Politics, 1880–1980 (also Society for the Humanities 409) Fall. 3 credits.
R 12:30–2:20, S. Clingen.
Over the past one hundred years South African literature has responded in the closest possible fashion to its changing political context. This course traces the history as revealed from the uneasy colonial settlement of the last century to the revolutionary foreshadowings of whites and black writers such as Gordimer, Coetzee, and Seroie at its end. Through the fiction other issues are considered: cultural politics, the construction of race and racism in South Africa, ideology in fiction, and the nature of a political aesthetic.


456 Edith Wharton, Willa Cather, and Eudora Welty (also English 656 and Women's Studies 456) Fall. 4 credits.
A representative selection of the best fiction of three distinguished American women writers with particular regard for their representation of women in relation to environment, for their characteristic themes and materials, and for their practice of the craft of fiction. Readings: Wharton, The House of Mirth; Summer, The Age of Innocence, and selected short stories. Cather, O'Pioneers!; A Lost Lady; The Professor's House, and selected short stories; and Welty, The Robber Bridegroom, The Golden Apples, The Optimist's Daughter; and selected short stories. Discussion format with three essays.

457 The American South in the South American Novel: A Close Study and Comparison of the Fiction of William Faulkner and Gabriel Garcia Marquez Spring. 4 credits.
M.W.F. 12:20, L. Herrin.
We will read and discuss at least four books apiece by these (in Faulkner's words) "southern propagandists" of fictional worlds. Certainly Faulkner's The Sound and the Fury and Absalom, Absalom! and Garcia's One Hundred Years of Solitude and Autumn of the Patriarch will be among them. We will discover what we will discover, but we will be very much interested in the nature of Faulkner's influence on Garcia's work and perhaps, by extension, in what the American South and South America have fictionally in common. Students will be expected to read, write interpretive papers, and talk.

459 Contemporary British Drama Spring. 4 credits.
The contemporary scene in English theater. Plays by Tom Stoppard, Harold Pinter, Peter Shaffer, Caryl Churchill, David Edgar, Howard Breton, and Edward Bond, with particular concern for the theater as a political and social institution.

461 Gender in Nineteenth-Century America (also English 661 and Women's Studies 460) Fall. 4 credits.
TR 1:25–2:40, S. Samuels.
A study of the relation between historical experience and literary texts. We will examine from the perspectives of both historical and literary analysis the rise of women writers, the novel's preoccupation with conflicts between men and women, the cultural uses of feminism and antifeminism, and the impact of the new woman. Bringing traditional literary texts—novels and poetry—into dialogue with "nonliterary" writings like journalism, political treatises, social reform manifestos, and etiquette books, we will draw on the methods and theories of cultural history and literary criticism to ask how gender relations and the history of women bear on the plots, discourses, and images of literary texts. A tentative reading list includes Susannah Rowson's Charlotte Temple, Sylvia Plath's Ariel, and their selected short stories; and Welty, Edith Wharton's House of Mirth, William Dean Howells's A Hazard of New Fortunes, and Charlotte Perkins Gilman's Herland.

466 Williams and Stevens Fall. 4 credits.
T 7:15, R. Gibson.
A close study of the careers and works of two major American poets. We will read their poems (and some prose) against each other, seeking to define the ways in which their poetic projects are both complementary
and antithetical. Williams's dictum "no ideas but in things" and Stevens's assertion "It must be abstract" might sound flatly contradictory, but in many ways these two poets can be seen as collaborators striving to develop an American poetry that will be responsive to the unique pressures of its time. Our primary focus will thus be on how they divide up the labors of creating such a poetry between them. In addition we will attempt to situate their works in relation to both the romantic and modernist traditions of continuity with the past and innovation in the present. We will conclude with a consideration of the tremendous influence both poets have had on American poetry in the last thirty years.

468 James Baldwin Spring. 4 credits.
In the thirty years since his first novel, Go Tell It on the Mountain, Baldwin's eloquent, painful, and brilliant analysis of the American search for an identity encyclopedic enough to embrace the presence of Black people. Reading widely among his fiction, essays, and drama, we will appreciate why Baldwin remains our best chronicler of the rage and love, bitterness and hope, and desire and despond, that, when taken together, form so crucial a part of the Afro-American and American genesis. Readings will include Notes of a Native Son, Another Country, Sonny's Blues, Go Tell It on the Mountain, Blues for Mr. Charlie, Giovanni's Room, Going to Meet the Man, and Just Above My Head.

480—481 Seminar in Writing 480. Fall. 481. Spring. 4 credits. Limited to 15 students. Students are encouraged to take English 280—281 and either 382—383 or 384—385 previously. Prerequisites: permission of instructor, normally on the basis of a manuscript. Fall: M 2:30—4:25, P. Janowitz; T 2:30—4:25, L. Herrin. Spring: M 2:30—4:25, D. McCull; T 2:30—4:25, W. Statoff.
Intended for those writers who have already gained a basic mastery of technique. Students normally enroll for both terms and should be capable of a major project—a collection of stories or poems, a group of personal essays, or perhaps a novel—to be completed by the end of the second semester. Seminars are used for discussions of the students' manuscripts and published work that individual members have found of exceptional value.

487 American Visions and Revisions Spring. 4 credits.
T R 2:30—3:45. C. Strout.
This seminar in intellectual and literary history theory explores several close encounters of mind with mind between writers whose work—whether fictional, political, philosophical, or religious—responds to that of a predecessor and by doing so defines an important American theme and revises it in a new context. Examples focus on the relation of Whitman and William James to Emerson, of E. Whitman to H. James, of Faulkner to T. S. Eliot, of Lincoln to Jefferson, of Neibuhr to Jefferson and Lincoln, and of M. L. King to Jefferson, Lincoln, and Neibuhr.

491 Honors Seminar I Fall.
Section I: Experimental Fiction by Twentieth-Century Women Writers 4 credits.
With only a few exceptions, the works of fiction that we associate with the two great avant-garde movements of the twentieth century—modernism and postmodernism—were written by men. Does this mean that women writers prefer traditional modes of narration or are uneasy with innovation or have some sort of innate or acculturated affinity with realism or naturalism? To an overwhelming extent, both "mainstream" and feminist critics have assumed that, for whatever reason, women in the twentieth century have not produced structurally and stylistically innovative narratives. This seminar will scrutinize the evidence that is presumed to support this assumption. We will examine the cultural context that may bias readers against seeing what is genuinely new and exciting in works by female authors, as well as ways in which the works themselves may not resemble works by acknowledged male experimental writers—the difference that might be produced by sexual difference. The first half of the semester will focus on Virginia Woolf and on placing two of Woolf's novels in the context of fiction by three important but less-famous female contemporaries: Dorothy Richardson, H. D., and Djuna Barnes. The second half of the semester will concentrate on three writers of the contemporary period: Doris Lessing, Alice Walker, and Margaret Atwood. Ideally we will conclude the course both with a more complex understanding of twentieth-century literary history and with an expanded sense of the possibilities implicit in the notion of experimental fiction.

Section II: Narrative with the Novel 4 credits.
M W F 1:25, R. Parker.
Readings in short- and medium-length verse and prose narratives by such writers as Spenser, Shakespeare, Bunyan, Blake, Wordsworth, Coleridge, Keats, Hoffmann, Poe, Hawthorne, and Nabokov, with emphasis on various aspects of narrative structure and technique as they bear on problems of interpretation and attention to some issues of story telling raised by recent critical and theoretical argument.

492 Honors Seminar II Spring.
Vision and form in major texts from the period between the world wars. An exploration of the search for values in a troubled era and of concomitant formal experiments. The syllabus will include Lawrence, Women in Love: Joyce, Ulysses (selections); Pound, Hugh Selwyn Mauberly and The Cantos; Eliot, The Waste Land and Four Quartets, Woolf, Mrs. Dalloway and To the Lighthouse; Hemingway, The Sun Also Rises; and Yeats, The Tower and Last Poems. Some attention will be given to parallel developments in the visual arts.

Section II: Studies in Chaucer's Canterbury Tales 4 credits.
M W F 1:25, W. Wetheber.
We will read a selection of Chaucer's tales and consider how Chaucer's poem can be illuminated by various kinds of recent criticism—sociological, historical, feminist, etc.—and by the work of critics who have dealt directly with the problem of the "otherness" of the Middle Ages.

493 Honors Essay Tutorial I Fall or spring. 4 credits. Prerequisite: senior standing and permission of the chairperson of the honors committee.

494 Honors Essay Tutorial II Fall or spring. 4 credits. Prerequisite: English 493 and permission of the chairperson of the honors committee.

495 Independent Study Fall or spring. 2—4 credits.

Courses Primarily for Graduate Students
Permission of the instructor is a prerequisite for admission to courses numbered in the 600s. These are primarily intended for graduate students, although qualified undergraduates are not excluded. Undergraduates seeking admission to a 600-level course should consult the appropriate instructor. The list of courses given below is illustrative only; a definitive list, together with course descriptions and class meeting times, will be published in a separate department brochure before course enrollment each term.

611 Readings in Old English Fall. 4 credits.
T. Hill.

612 Beowulf Spring. 4 credits.
T. Hill.

613 Middle English Literature Fall. 4 credits.
R. Kaske.

614 Middle English Lyric I Fall. 4 credits.
T. Hill.

615 Middle English Literature II Spring. 4 credits.
R. Kaske.

619 Chaucer Spring. 4 credits.
R. Kaske.

622 English and American Seventeenth-Century Prose Fall. 4 credits.
M. A. Radziszewicz.

627 Shakespeare: Tragedies and Romances Fall. 4 credits.
S. McMillin.

628 Elizabethan and Jacobean Drama Spring. 4 credits.
S. McMillin.

632 Samuel Johnson Spring. 4 credits.
D. Eddy.

638 The Eighteenth-Century Sublime Fall. 4 credits.
N. Saccamano.

643 Writers of the Revolution Spring. 4 credits.
R. Parker.

646 Studies in Victorian Prose Fall. 4 credits.
P. Sawyer.

565 Edith Wharton, Willa Cather, and Eudora Welty Fall. 4 credits.
J. Blackall.

660 Contemporary American Indian Literature Spring. 4 credits.
J. Welch.

661 Gender in Nineteenth-Century Literature Fall. 4 credits.
S. Samuels.

663 American Naturalism Spring. 4 credits.
M. Seltzer.

665 American Modernism Winter. 4 credits.
J. Porte.

666 Readings in Modern Fiction: Distance, Sympathy, and Reader Response Fall. 4 credits.
W. Statoff.

668 Postmodern Fiction Spring. 4 credits.
M. Hite.

672 Close Readings for Writers: Fiction Spring. 4 credits.
S. Vaughn.

673 Forms of Poetry Fall. 4 credits.
D. Fried.

675 Women's Poetry Spring. 4 credits.
D. Mermin.

676 Close Readings for Writers: Poetry Spring. 4 credits.
P. Janowitz.

678 Philosophy and Theory of Tragedy Spring. 4 credits.
T. Murray.

681 Afro-American Literature Spring. 4 credits.
H. L. Gates.
There are eighteen faculty members, including Cornell's president, in the department, and forty undergraduate majors. A variety of courses provides our students with a broad and solid foundation. The department is particularly strong in geophysics, petrology and geochemistry, structural geology, and tectonics.

Students study the deeper parts of the earth's crust using many techniques but concentrating on seismic methods. High-pressure, high-temperature mineralogy research uses the diamond anvil and Cornell's synchrotron as research tools. Undergraduates have served as field assistants for faculty and graduate students who work in Greenland, British Columbia, the Aleutian Islands, Scotland, Barbados, the South Pacific, South America, and various parts of the continental United States. Undergraduates are encouraged to participate in research activities, sometimes as paid assistants.

Students who major in geological sciences are encouraged to take courses appropriate to their interests in the other sciences and mathematics. In order to develop skills in observing the natural earth, geology majors attend six-week summer field camp, usually during the summer following their junior year.

Cornell has recently established a joint summer field camp with Harvard and Yale in the Sierra Madre of Wyoming.

The Major

The prerequisites for admission to a major in geological sciences in the College of Arts and Sciences are two two-semester sequences, Mathematics 191 - 192 and Physics 112 - 113, or their equivalents, and an additional semester course in chemistry or biological sciences, such as Chemistry 207 Geological Sciences 101 - 102 or 201 are recommended, but a student with a strong foundation in mathematics and science may be accepted as a major without completion of 101 - 102 or 201.

Majors take five core courses in geological sciences, a summer field geology course, six credits of additional course work from geological sciences courses numbered 300 or 400, plus an additional course in mathematics, physics, chemistry, or biology at an intermediate or advanced level.

Core Courses

326 Structural Geology
355 Mineralogy
356 Petrology and Geochemistry
375 Sedimentology and Stratigraphy
388 Geophysics and Geotectonics

Prospective majors should consult one of the following departmental major advisers: J. L. Cisne, A. L. Bloom, or W. B. Travers, as early as possible for advice in planning a program. Students majoring in geological sciences may attend the departmental seminars and take advantage of cruises, field trips, and conferences offered through the Department of Geological Sciences.

Courses offered at the 100 and 200 level are open to all students. Certain 300-level courses in geology may be of particular interest to students of chemistry, biology, ecology, and physics. Students are encouraged to inquire about courses that interest them at the department office in See Hall.

Honors. An honors program is offered by the Department of Geological Sciences for superior students. Candidates for honors must maintain an overall 3.0 grade-point average and a cumulative average of 3.5 in the major and complete an honors thesis (Geological Sciences 450). Students interested in applying should contact the director of undergraduate studies during the second semester of the junior year.

Courses

For course descriptions see the Geological Sciences listing in the College of Engineering.
The Department of German Literature offers courses in German, medieval German, Yiddish, and Old Icelandic literatures, which reflect the heterogeneous composition of the department. These courses range from close readings of major texts through courses in culture and intellectual history. Major areas of specialization cover the period from the early Middle Ages to the twentieth century, with emphasis on literature since 1750. The department often cosponsors courses with the Departments of Music, History of Art, Theatre Arts, History, Government, and Comparative Literature and with the Medieval Studies and Women's Studies programs.

For information about majors and courses, see Modern Languages, Literatures, and Linguistics.

Government


Government is what Cornell calls a department that elsewhere might be termed political science. The focus of this discipline is power applied to public purposes. Some faculty concentrate on purposes, some on applications. Some engage in the close reading of great texts of political philosophy, while others analyze the behavior of power-wielders and publics in this and other societies. Government is divided into four subfields: United States politics, comparative politics (other nations), political theory (philosophy), and international relations (transactions between nations).

To accommodate new courses or course changes, a supplementary announcement is prepared by the department. Before enrolling in courses or registering each term, students are requested to consult the current supplement listing courses in government, available in 125 McGraw Hall.

The Major

To be admitted to the major, a student must have passed or be currently taking two government courses, one an introductory course, the second any other course offered by the department, including freshman writing seminars.

To complete a major in government, the student must (1) pass three of the four introductory courses; (2) accumulate 24 credits in courses numbered 300 or higher, including one seminar; and (3) complete 12 credits in related fields, again at the 300 level or higher. All courses used to fulfill a government major must be passed with a letter grade. Majors are urged to complete the introductory course requirement early in their stay at Cornell.

Seminars are those courses numbered 400, 490, and 500, plus whatever additional courses the director of undergraduate studies may designate. To be admitted to a seminar, students apply during the course scheduling period held the previous semester. Related fields normally include courses offered by these departments: Anthropology, Economics, History, Psychology, and Sociology. Majors should discuss their selection of related courses with their advisers. When approved by an adviser or by the director of undergraduate studies, courses from still other departments may be used to fulfill this requirement.

Cornell-in-Washington program. Government majors also have an opportunity to apply to the Cornell-in-Washington program, in which students take courses and undertake a closely supervised externship during a fall or spring semester. For further information see p. 7.

European studies concentration. Government majors may elect to group some of their required and optional courses in the area of European studies, drawing from a wide variety of courses in relevant departments. Students are invited to consult Professors P. Katzenstein, Scheinman, and Tarrow for advice concerning course selection, foreign study programs, etc.

International relations concentration. See the description under "Special Programs and Interdisciplinary Studies."

Honors. Each fall a small number of seniors enter the honors program. To apply, junior majors submit applications in May. Along with a fuller description of the honors program, application forms are available in 125 McGraw Hall. The three courses comprising the honors sequence (honors courses) are described below.

Introductory Courses

Students registering for introductory courses should register for the lecture only. Sections will be assigned during the first week of class.

111 The Government of the United States

Spring. 3 credits.

B. Ginsberg

An introduction to government through the American experience. Concentration on analysis of the institutions of government and politics as mechanisms of social control.

131 Introduction to Comparative Government and Politics

Fall. 3 credits.

M. J. Esman

A survey of the institutions, processes, and major problems of politics and government in contemporary states. The structures and ideologies of different regimes, the relationships of individuals and groups to the state, the shaping and implementation of public policy, the regulation of political conflict, and the adaptation of political systems to changing conditions. Particular attention is paid to the government and politics in Great Britain, France, the Soviet Union, China, Nigeria, and Mexico.

161 Introduction to Political Theory

Spring. 3 credits.

W. J. Dannhauser

A survey of the development of Western political theory from Plato to the present. Readings from the works of the major theorists. An examination of the relevance of their ideas to contemporary politics.

181 Introduction to International Relations

Fall. 3 credits.

P. Katzenstein

An introduction to the basic concepts and practice of international politics.

Freshman Writing Seminars

100 Freshman Seminars

Fall, spring or summer. 3 credits. Seminars will be offered in fall, spring, and summer terms. Consult the listings for the Freshman Seminar Program in the section "Special Programs and Interdisciplinary Studies." The supplement issued by the department, and the Freshman Seminar booklet for course descriptions and instructors.

Major Seminars

400 Major Seminars

Fall or spring. 4 credits.

These seminars, emphasizing important controversies in the discipline, cap the majors' experience. Thus preference in admission is given majors over nonmajors and seniors over juniors. Topics and instructors change each semester. To apply, students should pick up a form in 125 McGraw during the course selection period the semester before the seminar is given.
The following courses are open to sophomores, juniors, and seniors without prerequisites unless otherwise indicated.

**American Government and Institutions**

Government 111 is recommended.


309 *Interpretations of American Politics* Fall, 4 credits. R. King.

This course shall attempt to move beyond description and seniority to investigate these disparities both empirically and normatively, and to assess the impact of government upon them. Topics for discussion will include What do we mean by distributional inequality and by the demand for greater egalitarianism? What is the extent of inequality and of poverty in America today? How does one establish minimum standards for distributional justice? Is the United States currently on the road toward achieving that minimum standard? What is the array of federal welfare programs presently available, and what is their effect? How does one understand the role of the welfare state under conditions of mass unemployment and how what different forms has it assumed in different countries? How do we explain its particular American manifestation? What reforms are currently on the political agenda? Can we imagine a society somewhat like that in America achieving a very different distributional result?

311 *Urban Politics* Spring, 4 credits. M. Shefter.

The interaction between urban problems and the politics of city government has resulted in important public policy issues in the United States. This course provides an introduction to the politics of metropolitan areas; analysis of the central institutions and processes of urban government such as mayors, city councils, elections, and the criminal justice system; and specific public policy problem areas such as race relations, education, housing, law enforcement, and civil disorder.

312 *Urban Affairs Laboratory* Fall or spring, 4 credits. Open to both undergraduate and graduate students. Application required to assure balanced enrollment from different colleges and majors. Applications available in 125 or B29 McGraw Hall. Course fee: $20. E. W. Kelley.

An interdisciplinary course in urban affairs that emphasizes learning through participation in a complex gaming simulation. Students assume roles of decision makers in a simulated city and test their solutions to environmental, economic, social, and political problems. Issue-related readings and lectures provide complementary theoretical focus.


A general education course for students at the sophomore and higher levels. Law is presented not as a body of rules but as a set of varied techniques for resolving conflicts and dealing with social problems. The roles of courts, legislatures, and administrative agencies in the legal process is analyzed, considering also the constitutional limits on their power and practical limits on their effectiveness. Readings consist mainly of judicial and administrative decisions, statutes and rules, and commentaries on the legal process.


318 *The American Congress* Fall, 4 credits. M. Shefter.

The role of Congress in the American political system. Topics to be discussed: the political setting within which Congress operates, the structure of Congress, the salient features of the legislative process, and recent congressional behavior in a number of policy areas.


323 *The "Fourth" Branch* Spring, 4 credits. J. Rabkin.

The national administrative branch is examined. Particular attention is given to the constitutional and political problems that result from the rise of administrative power.

327 *Civil Liberties in the United States* Spring, 4 credits. J. Rabkin.

An analysis of contemporary issues in civil liberties and civil rights, with emphasis on Supreme Court decisions. Cases are analyzed in terms of democratic theory and the social and political context in which they arose.

328 *Constitutional Politics: The United States Supreme Court* Fall, 4 credits. J. Rabkin.

The course investigates the role of the Supreme Court in American politics and government. It traces the historical development of constitutional doctrine and the institutional role the Court has played in American politics.


353 *Feminism, the State, and Public Policies (also Women's Studies 353)* Fall, 4 credits. M. Kattenstein.

The course examines the aims and strategies of the feminist movement in the United States and the response of both society and the state to feminist claims. It is thus a course about political protest and the capacity of American political institutions to promote and shape as well as to counter social change. In examining the law and public policy on such issues as job discrimination, welfare, rape, abortion, etc., the course explores the contradictions between, and the congruence of, the dual ideals of individual choice and group equality.


405 *Political Economy* Fall, 4 credits. E. W. Kelley.

What would Adam Smith and Karl Marx consider the causes of such problems as stagflation, an unfavorable balance of trade, the threat of protectionism, the growth of massive public and private sector bureaucracies, and excessive government regulation? What suggestions would they make about remedies? How can we evaluate both their suggestions and their evidence? Is representative democracy itself part of the problem? Can Woodrow Wilson, Thomas Jefferson, or Grant McConnell help us understand the effects of legislative behavior on economic transactions? This course will use selected works of Smith, Marx, Durkheim, Wilson, and more-recent authors like Mancur Olson, Bendix, and McConnell. Substantive focus will be on classical political economy; the development of the state; the rise of professions, guilds, and labor unions; regulation; and the increased delegation of public authority to private groups. Methodological focus will be on the ways of evaluating both discursive and quantitative evidence for the factual and causal claims of the authors read.


This course explores the varied interactions between science and the legal process that have developed in recent years as a result of attempts to bring greater public accountability to the use of science and technology. It examines the activities of both legislatures and courts in controlling science and analyzes the values underlying these initiatives. Three major types of science-law interactions form the focus of the course: regulation of new technologies, judicial review of risk-management decisions, and legal control of professional standards in science and technology. Specific topics include the regulation of toxic chemicals and nuclear power, controversies about biotechnology, reproductive technologies and biomedical research, and science fraud.


428–429 *Government and Public Policy: An Introduction to Analysis and Criticism* 428, Fall; 429, Spring, 4 credits each term. Open to undergraduates. Prerequisite for 429: 428 and permission of instructor. T. J. Lowi.

Government 428 concentrates on history and criticism of U.S. policies and the politics associated with them. Particular attention is given to the origins and character of the regulatory state and the welfare state. Government 429 is an opportunity to pursue further the research begun in 428.

**Comparative Government**

Government 131 is recommended.


331 Beyond the Year 2000 Spring. 4 credits. E. Kenworthy. B. Gibson. This course explores present projections of where the world will be twenty-five years from now, drawing on computer and other analyses of present trends regarding industrial and social conditions. An evaluation of these projections will be coupled with an analysis of what it would take to get a future we prefer over the future that appears likely.

[332 Politics and Society in France and Italy 4 credits. Not offered 1987–88.]

333 Government and Politics of the Soviet Union Fall. 4 credits. H. Fireside. The politics of the top leaders, the institutions through which they operate, and the impact of their policies on the Soviet people. Emphasis is also on phases in the development of the Soviet system and on the ways in which the Soviet Union served as the prototype for all subsequent Communist states.

334 Business and Labor in Politics Fall. 4 credits. T. J. Pempel. Historically, business and labor have been critical elements in shaping the specific politics of most advanced industrial democracies. Land grants to United States railroad magnates, unionization and class consciousness in continental Europe, the development of social welfare programs, and the politics of public sector workers and the role of imperialism in other areas of the world, are a few of the fields examined.

335 Modern Greek Poetry and Politics (also Comparative Literature 235 and Classics 235) Fall. 4 credits. G. Hotz-Warthoff. The history of modern Greece has been marked by a series of political crises that have resulted in deep divisions in society. Greek poetry has reflected these crises and divisions, and in this course the poetry of nineteenth- and twentieth-century Greece will be interpreted in its historical and political context. It will concentrate on four poets of which there has been a particularly strong interaction. The continuity of ancient Greek myths in modern Greek poetry will also be explored. Students taking this course as Government 335 or 4 credits must write an additional paper on a political topic.


340 Latin American Politics Fall. 4 credits. Limited to 50 students. E. Kenworthy. An introduction to the politics and society of key Latin American nations, combining a conventional overview (readings, examination) with simulations of current crises (research, role-playing).


343 Contemporary European Society and Politics (also History 283) Fall. 4 credits. J. Weiss and staff. An interdisciplinary and comparative investigation of Western European society, politics, culture, and contemporary history. Topics include the differing experiences of the generations coming of age after World War II, the dynamics of class relations, economic policy, social movements, family and community life, cultural institutions, and modes of cultural criticism.

[344 Government and Politics of Southeast Asia 4 credits. Not offered 1987–88.]

[345 Contemporary European Society and Politics (also German Literature 285 and History 285) 4 credits. Not offered 1987–88.]

346 Politics in Contemporary Japan Spring. 4 credits. T. J. Pempel. The focus will be on the political, social, and economic dimensions of power making in postwar Japan, with some particular attention given to ideological conflict, political parties and elections, the bureaucracy, the consumer movement, student protest, defense policy, and economic penetration of Southeast Asia.

347 Chinese Government and Politics Fall. 4 credits. V. Shue. An introduction to the main currents in China's domestic politics over the last fifty years. Topics include Mao Zedong and the Chinese Communists, the recent revisionist drive for power, peasants, communes, and rural politics; ultraleftist social idealism and mass mobilization, intreabureaucratic politics; the conditions for military and industrial modernization; and the recent turn toward "market socialism." No prerequisites.


349 Political Role of the Military Spring. 4 credits. B. Anderson. Comparative study of the political consequences of the military's role in the general transfer of power in some countries, and the role of the military in the solution of some international crises. Case studies of Poland, Cambodia, Vietnam, and South Africa are examined.

[350 Comparative Revolutions 4 credits. Not offered 1987–88.]

351 India: Social and Economic Change in a Democratic Polity Spring. 4 credits. M. Katzenstein. This course explores the social, economic, and political forces that have shaped India's development since independence. It considers why democratic political institutions in India have proved so resilient and what effect these institutions have on the economic and social policies that are pursued. The importance of international as well as domestic forces in shaping India's economic and political choices is also assessed.

[352 Lebanon: The Formation and Destruction of the Lebanese State (also Near Eastern Studies 397) Spring. 4 credits. M. Zamir. The course will discuss the process leading to the establishment of the Lebanese state and its disintegration. Topics will include the emergence of a Lebanese entity after the civil war of 1986 and intersectoral relations, the rise of the National Lebanese Maronite Christian Movement and its relations with France and the Arab National Movement, and the development of the unique Lebanese political system as well as the social and economic changes that took place after the establishment of independence. The course will analyze the Lebanese position in the inter-Arab and international arenas and the repercussions of the Arab-Israeli conflict, the causes and outcome of the civil war in 1975–76, the Syria-Israeli confrontation in Lebanon, and the war in 1982 and American intervention.

354 America in the World Economy Fall. 4 credits. P. Katzenstein. Unemployed auto workers in Detroit and the wool stores in New England signal an important change in America's relationship to the world economy. This course traces these changes in a number of fields (trade, money, energy, and technology), explains them as the result of the political choices of a declining imperial power that differ substantially from the choices of other states (Japan, Germany, Britain, France, the small European states, and Korea), and examines their consequences for America and international policies.

[355 Contemporary Revolutions 4 credits. Prerequisite: Government 350 or permission of instructor. Not offered 1987–88.]

356 Elites and Society: The Political Economy of Power Spring. 4 credits. N. T. Uphoff. For students who have an interest in the nature and uses of power in politics. Consideration of how power has been treated by earlier political thinkers and by contemporary social scientists. Propositions will be formulated and criticized about the distribution and consequences of power in America, in one-party and industrialized societies, and in the Third World, and their implications for the making of public policy. A game simulation, Third World Power Play, is undertaken at the end of the course.

[357 Political Development in Western Europe 4 credits. Not offered 1987–88.]

358 Politics of the Middle East (also Near Eastern Studies 294) Fall or summer. 4 credits. M. Zamir. An examination of the Middle East conflict, including domestic and foreign determinants of Arab and Israeli policy. The impact of major-power conflict on Middle Eastern politics, the sources of instability in local regimes, and the problem of small-state dependence on the superpowers.


[360 The Politics of Productivity: Germany and Japan 4 credits. Not offered 1987–88.]

[361 Theories of the State 4 credits. Not offered 1987–88.]

[362 Labor and Politics 4 credits. Not offered 1987–88.]


435 Collective Action and Politics in Modern Europe (also History 435) Spring. 4 credits. S. Tarrow, S. Kaplan. An interdisciplinary seminar examining the causes, dynamics, and outcomes of social movements in modern and contemporary Europe. Ranging from the carnivalesque uprisings, bread riots, and tax revolts of early modern Europe to the strikes and revolutions of the nineteenth century to the student, peace, and women's movements of the present, these movements have deeply marked the development of contemporary state and society. Cases will be drawn mainly from Europe, with ventures into America and the non-Western world. Our ambition is to assess the ways in which popular collective action both shaped and was shaped by the development of the modern state. A senior seminar in modern Europe studies.


[446 Comparative Communism 4 credits. Not offered 1987–88.]

144 Arts and Sciences
The seminar will then go on to examine the scholarly, psychological, and anthropological dimensions.

Particular attention will be paid to the influences of racism and anti-Semitism on these historiographical shifts. We will conclude by surveying the situation of scholarship in these subjects in the 1980s and focus on the continued viability of the "Aryan model.""
401 Superpower Security and Third World Conflicts
Fall. 4 credits.
M. Heiler.
The purpose of this course is to examine the security involvements of the superpowers in the Third World in the overall context of their foreign policies. The first half of the course will deal with general theoretical and historical issues: the role of the Third World in Soviet and American definitions of national security, the interrelationships of superpower security policies (arms transfers, security assistance, military presence, use of proxies, etc.), and problem of commitment, escalation, and potential confrontation in Third World conflicts. The second part of the course will be based on student presentations of research on contemporary conflicts in the Third World in which the superpowers are, or may become, engaged. Concluding sessions will deal with policy-oriented ideas for crisis management and crisis avoidance.

Honors Courses

Each April a limited number of junior majors are admitted to the honors program, their work to begin the following fall. Application forms and a full description of the program may be obtained in 125 McGraw Hall.

490 Honors Seminar: Research Methods
Fall. 4 credits. Limited to students admitted to the honors program.
Staff.

494 Honors Thesis Clarification and Research
Fall. 4 credits. Limited to students who have successfully completed Government 490 or 500 or who are taking 490 concurrently.
Staff.
Each student works individually with a faculty member. The student initiates the tutorial by interesting a faculty member in his or her likely thesis project and by submitting to the director of undergraduate studies a form outlining the general area the thesis will treat and bearing the faculty tutor’s signature. This form is due the third week of classes. The tutorial culminates in a ten- to fifteen-page paper setting forth the central questions to be addressed by the thesis, the state of existing knowledge regarding those questions, and why they matter.

495 Honors Thesis: Research and Writing
Spring. 4 credits. Limited to students who have successfully completed Government 494.
Staff.
Students continue the work of the preceding semester, typically with the same faculty tutor. Research on the thesis is completed and writing begun. The tutorial culminates in a thesis of some sixty to eighty pages. The grade for the tutorial is determined by the faculty tutor, while the degree of honors (if any) awarded the thesis is decided by a committee of faculty members established for that purpose.

Supervised Study

Except under very unusual circumstances, supervised study, Government 499, is open only to government majors doing superior work in the major. The application form may be obtained in 125 McGraw Hall and must be approved by the director of undergraduate studies for credit to be granted. There is no limit established for the total number of credits a government major may take in Government 499 while at Cornell, but he or she may not count no more than 4 credits toward fulfillment of the major. Students who want to continue taking the course for more than one semester must select a new theme or subject each semester, and applicants must present a well-defined program of study that cannot be satisfied by taking regular courses. Credit may be given only for work that results in a satisfactory amount of writing. Emphasis is on the capacity to subject a body of related readings to analysis and criticism. Permission of the instructor is required.

499 Readings
Fall or spring. 1–4 credits.
Staff.

Graduate Seminars

Qualification for the seminar is based on student presentations of research on contemporary conflicts in the Third World in which the superpowers are, or may become, engaged. Concluding sessions will deal with policy-oriented ideas for crisis management and crisis avoidance.

Field Seminars

601 Scope and Methods of Political Analysis
Fall. 4 credits.
S. Jackson.
This seminar offers an overview of the main problem areas and theoretical orientations in the four subfields of contemporary political analysis: political theory, American politics, comparative politics, and international relations. Selected topics, including questions of research design, are treated through a reading of the best contemporary literature. The broad issues of the philosophy of social science or specific techniques of analysis may also be addressed.

602 Field Seminar in Political Methodology
Fall. 4 credits. Not offered 1987–88.

603 Field Seminar in American Politics
Fall. 4 credits.
B. Ginsberg.
The basic issues and institutions of American government and the various subfields of American politics are introduced. The focus is on substantive information and theoretical analysis and problems of teaching and research.

604 Field Seminar in Public Policy
Fall. 4 credits. Not offered 1987–88.

605 Field Seminar in Comparative Politics
Fall. 4 credits.
T. J. Pempel.
An introduction to selected theoretical problems in the study of comparative politics and to their application in empirical analysis. Basic problems are social class and politics, authority and legitimacy, participation and mobilization, economic development and democracy, authoritarian and totalitarian politics, corporatism and pluralism, and nation building and political integration.

606 Field Seminar in International Relations
Fall. 4 credits.
R. N. Lebow.
A general survey of the literature and propositions of the international relations field. Criteria are developed for judging theoretical propositions and are applied to the major findings. Participants will be expected to do extensive reading in the literature as well as research.

607 Field Seminar in Political Thought
Spring. 4 credits.
W. J. Dannhauser.
An introduction to political thought through a reading of selected classics in political thought from Plato to Marx.

American Government and Institutions

[516 Theories of Judicial Review

[610 Labor in American Politics

[521 Elections and Public Policy

[623 Capitalism, the State, and the Economy

624 Political Change in the United States
Spring. 4 credits.
M. Shifter.
This seminar analyzes the sources and consequences of major realignments in American politics.

Public Policy

628 Politics of Technical Decisions I (also Sociology 515, City and Regional Planning 541, Management MBA 686, and Biology and Society 418)
Fall. 4 credits.
D. Nelkin.
Prerequisite: Government 628 or permission of instructor. Not offered 1987–88.

Comparative Government

610 The Cultural Origins of the French Revolution (also Comparative Literature 612 and Romance Studies 612)
Spring. 4 credits.
R. Chartier.
The point of departure is a critical reappraisal of the very concept of the Enlightenment. This implies both a "rereading" of the eighteenth century texts as well as of the modern theoretical and interpretive texts. It also requires careful examination of the circulation and use of printed materials, the forms and contexts of intellectual "sociability," new trends in education, the process of de-Christianization, the shifting character of French élites, and the connections between elite and popular culture.

636 Political Development of the European Welfare State

637 Peasantry, State, and Revolutionary Socialism

639 Politics of the Soviet Union

642 Comparative Ethnic, Racial, and Religious Politics

645 Chinese Politics
Spring. 4 credits.
V. Shue.
Discussion of the central topics in Chinese political economy since the revolution. Special attention to evaluating various theoretical approaches to the study of Chinese politics and to problems of research and interpretation.

647 Political Anthropology: Indonesia

658 Political Economy of Change: Rural Development in the Third World
Fall. 4 credits.
N. T. Uphoff.
The seminar analyzes strategies for economic, social, and political change, using an approach that integrates economic, social, and political factors into a common framework dealing with policy choices and political action. Attention focuses particularly on developing local capacities for initiative and implementation with broader participation from rural communities.
The political, bureaucratic, economic, and technical explicating cases. 

Students will read and carry out case studies on administration (personnel management, planning, development; the various functions involved in environments of administration for agricultural and rural responses—whether repressive or policy-innovative—and responses of a variety of critics, artists, and cultural critics to Gramsci’s challenge: the neoidealist film La Terra Trena, Griffith’s drama Occupations, the paintings of Cremomi, Forman’s novel Daniel Martin, Pasolini’s poem cycle “Ashes for Gramsci,” the mass-media analyses of Parenti (Inventing Reality) and Kakarkin (The Passing Age), the political philosophy of Laclau and Mouffe ( Hegemony and the Socialist Strategy), the theory and practice of “low-intensity conflict” as developed by the CIA and the NSC, and the cultural theories of Williams (Marxism and Literature) and Said (The World, the Text, and the Critic).

International Relations

685 International Political Economy Spring. 4 credits.

P. Katzenstein.

An exploration into a range of contemporary theories and research topics in the field of international political economy. The seminar will cover different theoretical perspectives and a number of substantive problems.


687 International Relations of Asia Spring. 4 credits.

G. McT. Kahin.

Studies of the relations of China, Japan, Korea, and the countries of Southeast Asia with one another and with the United States and the Soviet Union, with particular attention to the influences of domestic political factors.

Greek

See Department of Classics.

Hebrew

See Department of Near Eastern Studies.

Hindi-Urdu

See Modern Languages, Literatures, and Linguistics.

History

S. G. Cochran, chairman; G. C. Altschuler.


The popularity of history among Cornell students is due to its usefulness as preparation for graduate, professional, or law school and for any career that requires critical thinking and good writing; the reputation of the faculty for scholarship, teaching, and advising; and most of all, the intrinsic interest of the discipline. A wide variety of introductory and advanced courses is offered. The department is particularly strong in ancient, medieval, and modern European history; in American, Latin American, Chinese, and South Asian history; and in the history of science.

The Major

To complete the history major, a student must fulfill the requirements listed below:

1) Complete the prerequisite requirement by taking either Introduction to Western Civilization (History 151–152) or Introduction to Asian Civilizations (History 190–191) or, alternatively, three courses in European history—one in ancient history; one in medieval, Renaissance, or early modern history; and, one in modern history.

2) Take history department courses totaling 36 credits (which may include the prerequisite courses) and complete all these courses with a grade of C or better. Of the 36 credits, a minimum of 20 must be taken in courses numbered 250 and above.

3) Take a minimum of 8 credits in each of two of the following fields: American, European, Asian, or Latin American history.
American history or history of science. Alternatively, a student may elect to take a total of 16 credits in three of these fields. Credits taken to fulfill the prerequisite requirement (see item 1, above) do not count toward this requirement.

4) Take at least one course at the advanced (400 or higher) level.

5) Take two courses above the elementary level offered by other departments that relate to the student's area of special historical interest.

Prospective majors may want to discuss their proposed program with the director of undergraduate studies before formally enrolling with the department.

Honors. History majors with an overall B+ average in all their history courses are eligible to enroll in History 400, Honors Proseminar, which is normally taken in the junior year or, at the latest, in the fall of the senior year. (Honors candidates are strongly encouraged to take another 400-level seminar during their junior year.) Upon successful completion of the proseminar, students may become candidates for the degree of Bachelor of Arts with honors in history by submitting to a prospective faculty adviser a written thesis proposal delineating the general area of inquiry for an honors essay and having the proposal approved by the adviser. The proposal should be submitted as soon as possible after the completion of History 400, normally during the junior year or at the beginning of the senior year.

After acceptance of the proposal by an adviser, honors candidates should normally enroll with their advisers in History 401, Honors Research, during the first term of their senior year. History 401 is a 4-credit course that permits honors candidates to conduct research and to begin writing the honors essay. At the end of the first semester of the senior year, as part of the requirements for History 401, the student will submit to his or her adviser a ten-to-fifteen-page overview of the entire thesis and will undergo an oral examination on the broad field of history that the student researched. The examination will be administered by a committee consisting of the student's adviser and one other department member, who will eventually serve as a reader of the thesis. The committee will then recommend whether the student may proceed to enroll in History 402, Honors Thesis, during the final semester of the senior year. History 402 is a 4-credit course that permits honors candidates to complete the honors essay and to prepare both to defend the essay and to demonstrate their understanding of the general historical interests they have pursued with the major. Students who do not take History 400 in their junior year must submit both the thesis proposal and the prospectus by the end of the fall semester of their senior year in order to be eligible to enroll in History 402 by their final semester.

Honors candidates must complete a minimum of 40 credits in history, 8 of which must be History 400 and 402. The completed thesis will be examined by three readers, including the two faculty members who administered the preliminary oral examination.

The text of the honors essay may not exceed sixty pages except by permission of the chairperson of the honors committee and the student's adviser. Two copies will be due during the third week of April. In May each honors candidate will be given an oral examination administered by the major adviser and one or both of the essay readers. The examination will focus on the specific issues of the essay as well as the broad field of history in which the student has concentrated his or her research (e.g., Periclean Athens, seven-century science, nineteenth-century America).

To qualify for a Bachelor of Arts degree with honors in history, a student must (1) earn a cumulative average in all history courses and (2) earn at least a cum laude grade on the honors essay and on the oral examination.

Students considering the honors program should consult the department during the second term of their sophomore year or early in their junior year.

Course Offerings

Freshman writing seminars
Comparative history
History of science
American history
Latin American history
Asian history
Ancient European history
Medieval, Renaissance, and early modern European history
Modern European history
Honors and research courses

Freshman Writing Seminars

[104 Communes and Utopias: Alternative Life-Stories in American History Not offered 1987–88
G. C. Altschul.
This course examines individual and group critiques of American society and experiments with alternative lifestyles. Topics include the Puritans, the Oneida community, the Mormons, Walden, the Ferrer Colony and Modern school, Vedanta monasteries, Walden II, and contemporary communes.]

[106 Democracy and Education: History of Learning in America Fall. 3 credits.
A survey of the history of educational thought and institutions from Puritan times to the present, with emphasis on the nineteenth and twentieth centuries. Topics include the family and church as educational institutions, the democratization of education, the emergence of the university, educational testing, and vocational education. John Dewey and progressive education, "alternate education," student radicalism.]

M. B. Norton.
An examination of the American family in the context of changing times from the seventeenth century to the present day. Readings include both primary and secondary sources. Students research the past experience of their own families as part of the course.]

[108 Civil Liberties in the United States Spring. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.
T 2:30–4:35. R. Polenberg.
Freedom of speech and dissent from Jefferson's time to the present, with emphasis on the twentieth century. Topics include Jefferson and Madison; Lincoln and martial law; Holmes, Brandeis, and the Supreme Court; the relocation of Japanese Americans; the cold war and McCarthyism; religious cults and "brainwashing"; censorship and obscenity; John Milton, John Stuart Mill, and the critique of libertarianism.]

T. H. Hollosy.
The relationship between the attitudes and values of Europeans and the emergence of the global economic and political network since the Age of Discovery. The voyages of exploration, commercial expansion, and the consolidation and dissolution of modern empires are considered. Texts contemporaneous with these periods will be read and discussed to explore ways members of the North Atlantic community have explained and justified their emerging world influence in religious, racial, technological, and cultural terms.]

W. M. Pintner.
The state's attempt to maintain stability, and the tension between the dissenting intelligentsia and the mass of the population are examined. Russia before and after the revolution of 1917 is discussed.]

The aim is to uncover the true facts of Britain's conduct and situation from 1936 to 1946. Emphasis is on the fighting on land, sea, and in the air, but preparedness, economic warfare, diplomacy, and imperial power are considered. Topics include the Battle of Britain, the Battle of the Atlantic, and strategic bombing.]

[192 Japan and the West Fall. 3 credits. Prerequisite: permission of instructor. Limited to 12 students. Not offered 1987–88.
J. V. Koschmann.]

[193 China and the West before Imperialism 3 credits. Open to freshmen and sophomores. Prerequisite: permission of instructor. Not offered 1987–88.
C. A. Peterson.
What accounts for the first great passion for things Chinese in the West in the seventeenth and eighteenth centuries and then its recession before the waves of imperialism? This seminar explores this question, tracing the China vogue in thought, literature, art, and the crafts and making reference to actual circumstances in the China of the day.]

[205 The Growth of Democratic Political Democracy in the United States Fall. 3 credits. Limited to 14 students. Prerequisite: permission of instructor. Not offered 1987–88.
An examination of the democratization of American political life since the American Revolution. Such topics as the expansion of white, black, and women's suffrage and the changing concepts of participation and leadership in American politics will be explored. A number of books and documents covering the topic will be read and discussed and several short papers written.]

[214 Seminar on American Foreign Policy Fall. 4 credits. Open to freshmen and sophomores. Limited to 14 students; preference will be given to non–history majors. Prerequisite: permission of instructor. Not offered 1987–88.
T 2:30–4:25. W. LaFeber.]

This seminar examines major themes in Native American history from colonial times to the present. Discussions will consider the cultural histories of particular tribes as well as the comparative elements of Indian relations with non-Indians.]

Comparative History

[208 Anarchism in America and Europe Spring. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.
R. Polenberg.
Topics include Godwin, Bakunin, and Kropotkin; anarchism and socialism; the libertarian tradition; anarchists in the Russian Revolution; Emma Goldman and Alexander Berkman; the red scare and the Sacco–Vanzetti case; the Spanish civil war; and anarchism and education.]

Reading and discussion of classic interpretations of the rise, role, and character of cities in ancient Greece, medieval Europe, and nineteenth- and twentieth-century Europe and America. Further reading on the history of a particular city of the student's own choice. Several short papers.]
An interdisciplinary examination of the validity of the adage "man is what he eats." Among the topics: food and nutrition, food and social structure, the politics of food control, food and modernization, taste making, and food in religion and literature. Cases will be drawn widely across space and time, from Pharaoh's Egypt to the 1980s.

A study of the principal modes of warfare found both in the East and the West from ancient times up to the eighteenth century. Tactical evolution and the impact of innovations are stressed, but attention is also paid to the general social background and the role of nonmilitary factors.

Seminar format. An examination of the impact of the methodology and findings of demography on historical scholarship and the implications of historical research for the study of population. Focus will be on the relation of population to family and social structure, economic growth, political stability, collective mentality, etc. Readings in European and American history from the Black Plague through the Industrial Revolution.

Every culture has felt an urgent need to deal with death to disarm, rationalize, and integrate it by giving it sense. How a culture perceives and propitiates death reveals a great deal about its social and political structure, religious and artistic values, and economic and scientific goals. The nature of death is considered using a wide variety of examples drawn from throughout history.

409 Seminar on Work in Europe and America Fall. 4 credits. T 2:30–4:30. S. L. Kaplan.
A comparative study of the meaning of work in different societies from premodern times to the present. Emphasis on the "representations" of work of the actors themselves who worked, as well as of those who for various critical reasons did not work. The seminar will examine not only ideology but also the organization, practice, and physical place of work. It will explore theory as well as "cases," and draw on anthropological and sociological as well as historical materials.


454 The Herodotean Moment: The Uses and Abuses of "Western Civilization" (also Government 454 in 1987–88) Spring. 4 credits. Limited to 20 students. Prerequisite: permission of instructor. W 2:30–4:30. M. Bernal and staff.
The basic premise of the seminar is that the concept of "Western civilization" is a problematic one in need of critical analysis. The course will examine the historical evolution of the concept as seen in selected moments of actual and perceptual encounter with other civilizations. It will also inquire into the political uses and abuses of the concept, as well as its discursive, psychological, and anthropological dimensions.

476 Documenting the Depression: Film, Literature, and History Fall. 4 credits. For description see Modern European History.


History of Science

281–282 Science in Western Civilization 281, fall; 282, spring. 3 credits each term. History 281 is not a prerequisite to 282.

T 10:10–11:25. P. R. Dear
Traces changing perceptions of nature and human knowledge from Greek antiquity to the twentieth century. The present-day dominance of "science" as a symbol of progress and modernity lies rooted in the cultural traditions of medieval Christian Europe and its selective appropriation of a Greek heritage. This course aims to make comprehensible to both science majors and students of the humanities the historical structure and development of modern science and to show science as a cultural phenomenon. 281 runs chronologically up to the death of Isaac Newton. 282 covers the eighteenth, nineteenth, and early twentieth centuries.

287 Evolution (also Biological Sciences 207) Fall. 3 credits.
T 10:10: disc to be arranged. W. Provine.
Evolution is the most central concept in biology. This course examines evolution in historical and cultural context. Aims of the course include understanding of the major issues in the history and current status of evolutionary biology, and exploration of the implications of evolution for culture. Issues range from controversies over mechanisms of evolution in natural populations to the conflict between creationists and evolutionists.

288 History of Biology (also Biological Sciences 202 and Biology and Society 286) Spring. 3 credits. Prerequisite: one year of introductory biology.
An examination of the history of biology, emphasizing the interaction of biology and culture. Original writings of biologists constitute the bulk of reading assignments. This course covers the period from classical antiquity to the present, but primary emphasis is on twentieth-century biology.

Studies in the interaction between technological changes and social changes in Western Europe and America since the eighteenth century. Readings and lectures will deal both with instances of social transformation that accompanied technological changes and with the role of technology in social thought and cultural expression. Special attention to three periods: Britain during the Industrial Revolution, America in the nineteenth century, and America during the Vietnam War.

This course will survey the major themes in the development of the agricultural sciences from the time of the American Indians to the 1980s, including agricultural chemistry, entomology, horticulture, tractors, nutrition, the Dust Bowl and pesticides, individuals such as Liberty Hyde Bailey, Henry A. Wallace, and Rachel Carson; the rise of governmental support and institutions; and achievements of the recent Green and "Gene" Revolutions.

This course will consider (1) the history of women in science (since antiquity but chiefly in the twentieth century) and (2) the role of femininity and masculinity in science and engineering. Some acquaintance with the history of science will be helpful.


482 The Origins of Modern Science 1500–1700 Spring. 4 credits. W 2:30–4:30. P. R. Dear A seminar focusing on the changes in the European conception of nature and human knowledge that created modern science. A new way of perceiving the world, and a new ideology justifying its experimental manipulation, transformed the finite, earth-centered, organic universe of 1500 into the infinite, mechanical universe of Isaac Newton. The course traces these developments above all through the study of primary materials, using the writings of Copernicus, Galileo, Descartes, Newton, and other lesser-known figures to discover how technical and philosophical innovations emerged from the changing worldview of early modern Europe.

680 Seminar in Historiographical Approaches to Science Fall. 4 credits. W 2:30–4:30. P. R. Dear.
Examines philosophical and sociological dimensions of recent historiography of science.


781 Advanced Seminar in the History of Nineteenth-Century Science Fall and spring. 4 credits each term. Prerequisite: permission of instructor. L. P. Williams.

American History

[101–102 Introduction to American History 101, fall; 102, spring. 3 credits each term. 101 is not a prerequisite to 102. Not open to students who have taken History 201–202. Not offered 1987–88. G. C. Altschuler.
A survey of United States history designed to introduce students to major themes and interpretations. History 101 traces the origins and evolution of the nation through 1865. Topics include Puritanism, the American Revolution, the Constitution, Jacksonian democracy, and the Civil War. History 102 covers the period from the Civil War to the present. Topics include the Reconstruction, the Gilded Age, the world wars, the 1960s, Vietnam, and Watergate.]

An investigation of political organization and change among Native American societies. Discussions and assignments examine forms of tribal government, diplomacy, and warfare, as well as political relations with European colonies and the United States. Specific topics include pan-Indian confederacies, Indian policy, struggles over sovereignty, and Indian strategies of autonomy and resistance.

210 The Supreme Court and Civil Liberties Fall. 4 credits. Primarily for sophomores. Enrollment limited to 15 students. Prerequisite: permission of instructor. T 2:55–4:10. R. Polenberg.
The development of free speech doctrine from the era of Holmes and Brandeis to the present, with special attention to the controversies over such issues as dissent, libel, and censorship.

A reading and discussion course. The class will begin by examining sex roles in the United States in the
1900s, looking at a variety of sources like popular magazines and contemporary commentaries. We will then move backwards in time in an attempt to uncover the roots of current attitudes. The students will help determine which topics the class will investigate in detail.

255 The American Dream Fall. 4 credits.
M W F 1:25–2:15 F. Sorokin.
The culture of the United States is markedly different from that of the rest of the English-speaking world. What makes Americans distinct? Lacking from the beginning was the biosphere of soil and climate of other peoples. America has been primarily a set of promises: the American Dream. The emphasis of the course will be on the ironic contrast between this vision at its most-grandiose and the blood-and-soil amalgam of other peoples, America the roots of current attitudes. The students will help frontier to the urban jungle.

4 credits. Enrollment limited. Prerequisite: permission of instructor.

275 Crime and Punishment: From the Puritans to Mickey Spillane Spring. 4 credits.
A historical investigation of how the American literary imagination has dealt with the way of the transgressor in novels, short stories, plays, and movies. Readings on murder, guilt, and retribution on land and sea, from the frontier to the urban jungle.

307 The Jewish Immigrant Experience Fall. 4 credits. Enrollment limited. Prerequisite: permission of instructor.
R. 2–4 F. Sorokin.
In the half century after 1880 several million Eastern European Jews entered the United States with profound cultural consequences for themselves, their descendants, and the dominant Anglo-Saxon capitalist society they encountered here. Through a study of selected fiction and nonfiction materials this reading-discussion course will explore what America made of these immigrants and what they made of it.

311–312 The Structure of American Political History Fall. 4 credits each term.
M W F 10:10 J. H. Silbey.
311 examines the course of American politics from 1787 to the Civil War, focusing on the nature of decision making, political and legislative voting behavior, and the role of interest groups, political parties, and political elites in shaping our political history. 312 examines the course of American politics from 1865 to the present.

313–314 History of American Foreign Policy Fall. 4 credits each term.
History 313 examines policy and policy makers from Benjamin Franklin to Woodrow Wilson. 314 covers Wilson to Reagan. Emphasis is placed on domestic events that shaped foreign policy.

318 American Constitutional Development Spring. 4 credits.
M W. F. 10:10; disc. F 10:10 or D 2:20 M. B. Norton.
A study of the major themes of the constitutional history of the United States. Among the topics to be considered are the drafting of the Constitution, the Marshall and Taney courts, the constitutional crisis caused by slavery and emancipation, the rise of substantive due process, the expansion of civil rights and liberties for women and men in the twentieth century, and the contemporary court.

321 The Origins of American Civilization Spring. 4 credits.
M. W. F 1:25 M. Kammen.
The colonial origins of American culture and society, with emphasis on the emergence of distinctive institutions, attitudes, and social patterns. Topics include race relations, religion, politics, movements of protest, and cultural developments. Open to qualified freshmen.

323–324 Native American History 323, fall; 324, spring. 4 credits each term.
D. H. Urry. A survey of a North American Indian from the beginning of European contact to the present. Cultural, political, and economic changes experienced by particular societies will be covered. Emphasis given to general themes of Indian-white relations, comparative tribal histories, and the role of Native Americans in the overall history of the United States.

325 Age of the American Revolution, 1763–1815 Fall. 4 credits.
An examination of the process by which the thirteen English colonies became an independent and united nation, with emphasis on political thought and practice, social and economic transformation, and cultural development. Attention will be paid to the impact of the American Revolution on women, Blacks, and Indians as well as on white males.

M W. F. 10:10; disc. F 10:10 or D 2:20 M. B. Norton.
A survey of women's experiences in America from the seventeenth century to the present. Among the topics to be discussed are women's familial roles, the changing nature of household, and the women's rights movement, employment of women outside the home, racial and ethnic differences in women's experiences, and contemporary feminism.

327–328 American Frontier History 327, fall; 328, spring. 4 credits each term. Not offered 1987–88.
D. H. Usner.
Survey of exploration, settlement, and expansion across North America since the sixteenth century. The first term covers international rivalry over territory, frontier trade systems, Indian-colonial relations, and the early administration of United States territories. Topics in the second term include the evolution of land and Indian policies, life in frontier communities, and political movements and economic change in the American West.

330 The United States in the Middle Period, 1815–1850 Fall. 4 credits. Not offered 1987–88; next offered 1989–90.
An analysis of American society from the end of the second war with England to the crisis of 1850, stressing the developing trends of nationalism and sectionalism, the rise and results of Jacksonian democracy, and the internal tensions produced by physical growth and slavery.

331 The American Civil War and Reconstruction Spring. 4 credits. Not offered 1987–88; next offered 1989–90.
An analysis of the factors leading up to the breakup of the Union, the impact of the war in North and South, and the problems of reconstruction and restoration of the seceded states.

M W. F. 11:15 S. Blumin.
An examination of the process of urbanization in America from the earliest European settlements to the present. Emphasis will be placed on the development of urban forms, institutions, classes, and life-styles and on the changing impact of cities on nonurban areas and the nation as a whole. The first term covers the period up to the emergence of the industrial city (ca. 1860); the second term, the period from 1880 to the present.

336–337 American Social History 336, fall; 337, spring. 4 credits each term. History 336 is not a prerequisite to 337. Not offered 1987–88.
M W. F. 10:10 S. Blumin.
A history of American society, with emphasis on the transforming effects of such phenomena as industrialization, urbanization, immigration, national expansion, and institutionalization on the social life of anonymous Americans. The first semester will cover the colonial and Jacksonian eras, with emphasis on the latter. The second semester will focus upon the industrial-urban transformation of the late nineteenth and twentieth centuries.

340 Recent American History, 1917 to 1945 Fall. 4 credits.
T R. 12:20–1:10 disc to be arranged. R. Polenberg.
Topics include civil liberties and dissent in World War I, individualism and conformity in the 1920s; radicalism and reform in the New Deal, class, race, and ethnicity; Franklin Roosevelt and World War II; the Holocaust; and the atomic age.

341 Recent American History 1945 to the Present Spring. 4 credits.
T R 12:20–1:10 disc to be arranged. R. Polenberg.
Topics include the cold war and civil liberties; the Supreme Court and civil rights; Kennedy, Johnson, and social reform; the Vietnam War; the Carter and Reagan presidencies; and class, race, and ethnicity in modern America.

M W. F. 1:25 F. Sorokin.

M W. F. 11:15 disc to be arranged. R. L. Moore.
American thought and culture from 1890 to the present. Emphasizes the intellectual impact of major political and economic events and the adaptation of social ideas and values to new conditions.

Examining the interaction of the ideas and behavior of American religious groups with American culture and society. The course covers the nineteenth and early twentieth centuries.

411 Undergraduate Seminar in American Political History Spring. 4 credits. Prerequisite: permission of instructor. Offered in Cornell-in-Washington.
Hours to be arranged. J. H. Silbey.

414 Motivation of American Foreign Policy Fall. 4 credits. Prerequisite: History 314 and permission of instructor.

415 The United States and Russia, 1780 to 1914 Fall. 4 credits. Enrollment limited to 16 students. Primarily for juniors and seniors. Prerequisite: permission of instructor. Not offered 1987–88.
T R 2:30–4:15 W. LaFeber.
The course will analyze diplomatic relations between the United States and Russia between 1780 and 1914. Special attention will be given to the causes of the friendship of the early decades and why it changed to animosity. The domestic origins of the foreign policies of both nations will be stressed. Extensive individual research projects will be assigned.

418 Undergraduate Seminar in the History of the American South Spring. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.
J. H. Silbey.

419 Seminar in American Social History Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.
R. 2:30–4:30 S. Blumin.

421 Constitutionalism in American Culture Fall. 4 credits. Prerequisite: permission of instructor.
M. W. F. 2:30–4:30 M. Kammen.
This seminar (for juniors and seniors) will explore various trends, characteristics, episodes, and changes in American constitutionalism from the revolutionary era to the present. Weekly discussions and several essays are required.
configurations of institutional structure, knowledge, action, and conceptions of history. Japanese works in translation will be read and discussed in addition to secondary sources.

[399 War as Myth and History in Postwar Japan (also Asian Studies 381)] Fall. 4 credits. Not offered 1987–88.
T R 1:25. B. deBary, J. V Koschmann.
How is history told in postwar Japan? The course will examine persisting manifestations of the war memory in contemporary Japanese cultural life, with emphasis on ways in which the story of World War II has been reinterpreted, rewritten, and given new symbolic and factual significance in light of changing historical circumstances. Class discussion will focus on the interpretation of texts, ranging from political thought and history to fiction, film, and poetry.

489 Seminar in Tokugawa Thought and Culture Fall. 4 credits. Prerequisite: History 397 or 398 or permission of instructor.
T 2:55–4. J. V. Koschmann.
An examination of conceptions of political order and legitimacy in relation to literary, artistic, and religious patterns in Japan from the seventeenth to mid-nineteenth centuries. Problems include Japanese neo-Confucianism, the eruption of new discourses in the eighteenth century, peasan rebellion, urban culture, Western studies and, in the nineteenth century, militaritarianism and restorationism.

492 Undergraduate Seminar in Medieval Chinese History Fall. 4 credits. Prerequisite: History 393 or permission of instructor.
C. A. Peterson.
Topic for fall 1987: The life of the medieval Chinese literati—social, cultural, and intellectual—as seen through literature, biographies, art, and other materials.

[493 Self and Society in Late Imperial and Twentieth-Century China Fall. 4 credits. Prerequisite: History 191 or 294 or permission of instructor. Not offered 1987–88.
R 2:30–4:30. S. Cochran.
Conceptions of self and relations between the individual and society in China from the seventeenth century to the present.]

The relation between the visual arts and social change in China from the seventeenth century to the present. The value of art as a reflection of social reality and as an agent for social change analyzed on the basis of a variety of visual materials that range from calligraphy, paintings, and porcelains of the seventeenth and eighteenth centuries to woodblock prints, photographs, and films of the nineteenth and twentieth centuries.]

C. A. Peterson.]

693 Problems in Modern Chinese History Fall. 4 credits. Prerequisite: permission of instructor.
R 2:30–4:30. S. Cochran.
S. Cochran.]

[695 Early Southeast Asia: Graduate Proseminar Fall. 4 credits. Not offered 1987–88; next offered 1989–90.
Hours to be arranged. D. K. Wyatt.
Introduction to the history of Southeast Asia for graduate students. Students will be expected to attend the lectures and complete the readings for History 395, and they will meet separately as a group to further explore selected topics.]

696 Modern Southeast Asia: Graduate Proseminar Spring. 4 credits.
Hours to be arranged. T. Shiraishi.
Introduction to the modern history of Southeast Asia for graduate students. Students will be expected to attend the lectures and complete the readings for History 396, and they will meet separately as a group to further explore selected topics.

789–792 Seminar in Medieval Chinese History 791, fall; 792, spring. 4 credits each term. Prerequisite: permission of instructor.
C. A. Peterson.

[792–794 Seminar in Modern Chinese History 793, fall; 794, spring. 4 credits each term. Prerequisite: permission of instructor. Not offered 1987–88.
Hours to be arranged. S. Cochran.]

795 Seminar in Modern Southeast Asian History Fall. 4 credits.
Hours to be arranged. T. Shiraishi.

D. K. Wyatt.]

797 Seminar in Japanese Thought Fall. 4 credits. Prerequisites: some knowledge of Japanese language and permission of instructor.
Hours to be arranged. J. V. Koschmann.

Ancient European History

265 Ancient Greece from Homer to Alexander the Great Fall. 4 credits. Open to freshmen.
M W 11:15, disc. T 12:20 or 2:30, or W 3:35.
B. Strauss.
A survey of Greece from the earliest times to the end of the Classical period in the late fourth century B.C. The course focuses on the Greek genius: its causes, its greatness, its defects, and its legacy. The Heroic Age, the city-state, ancient democracy, and the intellectual ferment of the Greek Enlightenment are the main topics of study. Readings in translation from Homer, Aristophanes, Sophocles, Herodotus, Thucydides, Plato, Aristotle, and from the evidence of ancient inscriptions, coins, art, and architecture.

268 A History of Rome: from Republic to Holy City Spring. 4 credits. Open to freshmen.
M W 11:15; disc. T 10:10 or 12:20, or W 3:35.
B. Strauss.
A survey of Rome from the founding of the Republic to the end of the Western Empire. The focus is on the Roman conquest of the Mediterranean world and on the cultural reconquest of Rome by the vanquished. Roman politics, peasant society, imperialism, and propaganda are the main topics of the first half. The government of the Caesars, society during the Roman peace, and the fertile interaction of Romans, Jews, and Greeks that produced Christianity are the main topics of the second. Readings in translation include Cicero, Polybius, Josephus, Tacitus, Petronius, Plutarch, and Saint Augustine.

A twofold search for Alexander the conqueror and the man and for the character of the world he created, in which the Greek city was planted as far Egypt and India. These new cities saw a change from republicanism to monarchy, from community values to individualism, from particularism to ecumenicism; embraced the new philosophies of Stoicism and Epicureanism; and were the hothouses of a new religion. Christianity. Readings in translation include Arrian, Plutarch, Aristophanes, Menander, Theocritus, Polybius, the Book of Maccabees, Epicurus, and Lucretius.]

[452 The Tragedy of Classical Athens, 462–404 B.C. Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.
M 2:30–4:30. B. Strauss.
The nature of Athenian democracy, society, and culture in the "golden age" of Athens. The course will examine the influence of Athenian political life on the great tragedies of the age and the influence of tragedy on the Athenians' conception of their character and history. Readings from Herodotus, Thucydides, Aeschylus, Sophocles, Euripides, Aristophanes, Plato, Aristotle, and Plutarch.]

M 2:30–4:30. B. Strauss.
The fortunes of the city-state and citizen in an age of uncertainty. The focus is on Athens with some attention paid to the wider Greek world. Topics include the nature of Athenian politics, Athenian society, cultural change, the war between the city-states, crisis as a historical concept, and anthropology and ancient Greece. Readings in translation include Thucydides, Sophocles, Euripides, Aristophanes, Plato, Aristotle, Demosthenes, and Xenophon.

555 The Family and Politics in Ancient Greece and Rome Fall. 4 credits. Prerequisite: History 265, 266, or 461 or permission of instructor.
M 2:30–4:30. B. Strauss.
If Greece and Rome are the foundation, at least symbolically, of Western civilization, then the family is the foundation of Greece and Rome. We shall consider such topics in the ancient family as parents and children, sibling rivalry, marriage, gender roles, birth control, the family and social crisis, the family and politics, and the family in the early church. Wherever possible, analogies to, comparisons with, and the implications for, the United States in the 1980s will be suggested. Readings include legal and political speeches, comedy, tragedy, philosophy, sermons and religious texts, inscriptions, and modern scholarship.

461 The Greco-Roman World in Late Antiquity and Early Byzantine Times, A.D. 306–565 Spring. For description see Medieval, Renaissance, and Early Medieval European History.

Medieval, Renaissance, and Early Medieval European History

151 Introduction to Western Civilization Fall. 4 credits.
T R 11:15; disc to be arranged. L. P. Williams.
Western civilization is one of the great, and today, predominant, civilizations in the history of mankind. This course is intended to introduce students to its main characteristics and their historical development. Political, social, economic, and intellectual evolution will be traced from the dawn of Western civilization in Mesopotamia and Egypt to its decline in the two World Wars. Students will read both original sources and the works of contemporary historians. The course is also intended to sharpen writing skills. Deals with the development of Western civilization to 1600.

152 Introduction to Western Civilization Spring. 4 credits.
For description see Modern European History.

222 Public Life and Literature in Tudor England Fall. 4 credits. Prerequisite: permission of instructor.
M W 9:05; F. G. Macham.
A study of the chief developments in the political, governmental, and religious life of England in the sixteenth century and weekly discussions of a selection of Tudor prose, poetry, and drama.

223 Public Life and Literature in Stuart England Spring. 4 credits. Prerequisite: permission of instructor.
M W 9:05; F. G. Macham.
A study of the chief developments in the political,
governmental, and religious life of England in the seventeenth century and weekly discussions of a selection of Stuart prose, poetry, and drama.


263 The Earlier Middle Ages Spring. 4 credits. M W F 12:00–1:20. J. J. John. A survey of medieval civilization from ca. 300 to ca. 1100 dealing with religious, intellectual, political, and economic developments in Western Europe.

264 The High Middle Ages Fall. 4 credits. T R 10:10–11:25. J. G. Blythe. A survey of medieval civilization from ca. 1100 to ca. 1450 dealing with religious, intellectual, political, and economic developments in Western Europe. Lectures and class discussions.

350 Early Renaissance Europe Spring. 4 credits. T R 10:10–disc. to be arranged. J. Rondeau. This course studies political, economic, religious, cultural, and intellectual aspects of late medieval and early Renaissance society in Western Europe. We examine such issues as the concept of the Renaissance and ideas of decline and rebirth or renewal, the impact of demographic changes on fourteenth-century society, new forms of religious life and spirituality, and theories of government. Readings are drawn from primary sources and include writings by Dante, Meister Eckhart, Petrarch, Nicholas of Cusa, Erasmus, and Thomas More.

361 The Culture of the Early Renaissance (also Comparative Literature 361 and History of Art 350) Fall. 4 credits. Not offered as a history course 1987–88. T R 11:40–12:30; disc. to be arranged. C. Lazzaro, "E. Morris, and staff. Renaissance culture is introduced through six major figures: Petrarch, Alberti, Machiavelli, Leonardo, Erasmus, and Rabelais. Each figure will be the focal point for the critical examination of problematic issues in the areas of humanism, religious and political thought, literature, art, and architecture. In the discussion sections problems of interpretation will be approached through the analysis of primary source readings and works of art.

364 Introduction to the Culture of the Later Renaissance (also Comparative Literature 362 and History of Art 351) Spring. 4 credits. T R 11:40–12:30 plus disc, R or F 1:25. E. G. Dotson, C. Kaske, and staff. Although History 361 (also Comparative Literature 361 and History of Art 350) is not a prerequisite, this course is a continuation of it in that it similarly organizes and deals with the period immediately succeeding. Members of several departments will lecture on Luther, Michelangelo, Dürer, Montaigne, Edmund Spenser, Bodin, and Cervantes. Close reading of texts, literary and visual. Discussion will include methods of interpretation and historical analysis.


366 Medieval Culture, 1100–1300 Spring. 4 credits. Prerequisite: History 264 or permission of instructor. Not offered 1987–88; next offered 1988–89. T R 2:55–4:10. J. J. John. The origin and development of the universities will be studied as background for a consideration of the scholastic mentality and its influence on the art, literature, philosophy, science, script, and theology of the period. Readings from Abelard, Hugh of St. Victor, Bonaventure, Thomas Aquinas, Dante, and others.

367 Church and State during the Middle Ages Fall. 4 credits. Prerequisite: History 263–264 or permission of instructor. Not offered 1987–88. T R 3:45–4:15. B. Tierney. Relationships between ecclesiastical and secular authorities and the ways in which these relationships influenced the growth of government in the Middle Ages are considered. Particular attention is given to the development of medieval constitutionalism.

368 Francis of Assisi and the Franciscans Fall. 4 credits. Prerequisite: History 264 or knowledge of medieval background. W 2:30–4:30. B. Tierney. A seminar with lectures, class papers, and class discussions. The course will begin with detailed study of the early lives of Francis in translation, then consider the impact of the Franciscans on the medieval church and vice versa.

369 The History of Florence in the Time of the Republic, 1250–1530 Spring. 4 credits. M W 10:10; disc. to be arranged. T. Rupp. This course examines the experience of living in a medieval and Renaissance city— the city of Florence from the beginnings of the commune to the end of the Republic. Topics include Florentine society, politics, economics, religion, art, architecture and urban development, and political theory. Primary source readings are drawn from archival documents as well as from the writings of Dante, the chroniclers Compagni and Villani, diarists Pitti and Dati, civic humanists such as Bruni and Alberti, and the political theorists Rinuccini, Savonarola, Guicciardini, and Machiavelli.

371 History of England under the Tudors and Stuarts Spring. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. C. Holmes. An examination of the relationship between the intellectual developments of the period and political, social, and religious change. Topics for discussion will include political thought, religious toleration, witchcraft, and the role of women and the family.

374 War, Trade, and Empire, 1500–1815 Spring. 4 credits. M W 2:30–4:15. D. A. Baugh. Maritime enterprise, imperial policy, and naval power in the age of expansion. The rise and decline of the Portuguese and Spanish empires are considered, but the emphasis is on English, French, and Dutch rivalry in the Atlantic and Caribbean.

405 Population and History Not offered 1987–88. For description see Comparative History.

409 Seminar on Work in Europe and America For description see Comparative History.

451 Lord and Peasant in Europe: A Seminar in Social History Not offered 1987–88. For description see Comparative History.

461 The Greco-Roman World in Late Antiquity and Early Byzantine Times, A.D. 306–656 Spring. 4 credits. Prerequisite: History 263, 265, or 268 or permission of instructor. T R 2:30–4:30. B. Strauss. A seminar in the cultural, socioeconomic, and political history of the period. Topics include the interaction of paganism and Christianity; art form, civic life, and the individual; the family; Julian and Justinian; and the concept of decline and fall.


612 Seminar in the Cultural Origins of the French Revolution (also Government 510, Romance Studies 612, and Comparative Literature 612) Spring. 4 credits. Open to graduate students and advanced undergraduates. M 4–6. R. Chartier. The point of departure is a critical reappraisal of the very concept of the Enlightenment. This implies both a "re-reading" of the eighteenth-century texts as well as a shift from the modern theoretical and interpretive texts. It also includes careful examination of the circulation and use of printed materials, the forms and contexts of intellectual "sociality," "new" trends in education, the process of de-Christianization, the shifting character of French elites, and the connections between elite and popular culture.

663 Seminar in Renaissance History Spring. 4 credits. Open to qualified undergraduates with permission of instructor. Not offered 1987–88. Hours to be arranged. J. Najemy.

664–665 Seminar in Latin Paleography 664, fall, 665, spring. 4 credits each term. Hours to be arranged. J. J. John.

666 Seminar in Medieval History Fall. 4 credits. Not offered 1987–88. Hours to be arranged. J. J. John.


683 Seminar in Early Modern Intellectual History Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. Hours to be arranged. R. Hsiu.

Modern European History

151 Introduction to Western Civilization Fall. L. P. Williams. For description see Medieval, Renaissance, and Early Modern European History.

152 Introduction to Western Civilization Spring. 4 credits. History 151 is not a prerequisite for History 152.

225 Public Life and Literature in Nineteenth-Century Great Britain Fall. 4 credits. Prerequisite: permission of instructor. T R 9:00–10:15. F. G. Marsham. British political, constitutional, economic, and imperial history are studied in the light of Victorian prose, poetry, and drama. History and literature are both considered: history through lectures and discussions of constitutional documents; literature through comment upon readings. Authors assigned include Macaulay, Carlyle, Tennyson, Mill Darwin, Huxley, Gilbert and Sullivan, and Shaw.
226 Public Life and Literature in Twentieth-Century Great Britain Spring, 4 credits. Prerequisite: permission of instructor. T R 9:05, F. G. Marcham.

238 The Age of Reason: Science, Social, and Constitutional History is paralleled by the reading of plays. Both history and literature are considered. The development of parliamentary democracy in Great Britain, the consequences for her of the two world wars, the emergence of the welfare state, the application to the economy of nationalization, and Great Britain's withdrawal from imperialism are presented. Among the writers read are Shaw, Maugham, O'Casey, Sherriff, and Osborne.

258 English History from the Revolution of 1668 to the Present Fall, 4 credits. T R 1:25-2:40, D. A. Bangham.

283 Contemporary European Society and Politics (also Government 343) Fall, 4 credits. T R 2:55, disc to be arranged, J. H. Weiss.

322 Russian History to 1800 Fall, 4 credits. Open to freshmen. T R 10:10–11:25, W. M. Pinter.


362 Russian History to 1800 Fall, 4 credits. Open to freshmen. T R 10:10–11:25, W. M. Pinter.

363 Russian History since 1800 Spring, 4 credits. Open to freshmen. T R 10:10–11:25, W. M. Pinter.


409 Seminar on Work in Europe and America Fall, 4 credits. Not offered 1987–88. For description see Comparative History.


451 Lord and Peasant in Europe: A Seminar in Social History For description see Comparative History.


471 Russian Social History Fall, 4 credits. Prerequisite: one semester of Russian history or permission of instructor. W 12:20–2:30, W. M. Pinter.


[474] Topics in Modern European Intellectual History
Spring. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.

[476] Documenting the Depression: Film, Literature, and Memory
4 credits. Prerequisite: permission of instructor. Not offered 1987–88.
Hours to be arranged. J. H. Weiss.

Social and intellectual history of Britain and America in the 1930s with special attention to modes of documentation and to subjects lending themselves to treatment by film or oral history: work, popular culture, changes in urban and rural communities, family life, and poverty and unemployment.

477 Seminar on the Politics of the Enlightenment
Fall. 4 credits.
An inquiry into the historical origins of European (esp., French) political, social, and economic thought, beginning in the 1680s, at the zenith of Louis XIV's absolutism, and culminating in the French Revolution a century later. Emphasis is on the relation of criticism and theory to actual social, economic, religious, and political conditions. An effort is made to assess the impact of enlightened thought on the eighteenth-century world and to weigh its implications for modern political discourse. Readings in translation from such authors as Bayle, Montesquieu, Voltaire, Rousseau, Diderot, and others, as well as from modern scholarly and polemical literature.

478 Seminar in Eighteenth-Century French Social History
An assessment of the work and influence of F. Braudel, with attention to the trajectory of the "Annales" school.

480 Twentieth Century Britain
Spring. 4 credits.
Seminar topics include Ireland, the 1930s, the world wars and their impact, the decline of liberalism, the roots of Britain's economic problems, the decline of empire, the condition of the political parties, and the character of English society.

483 Seminar in Modern European Social History
Fall. 4 credits. Not offered 1987–88.
J. H. Weiss.

485 Seminar in Eighteenth-Century British History
D. A. Baugh.

486 Seminar in Nineteenth-Century British History
D. A. Baugh.

467 Seminar in the French Revolution
S. L. Kaplan.

672 Seminar in European Intellectual History
Fall. 4 credits.
W 2:30. D. LaCapra.

673 Seminar in European Intellectual History
Hours to be arranged. D. LaCapra.

677 Seminar in Russian History
Fall. 4 credits.
Hours to be arranged. W. M. Pinther.

678 Seminar in Modern European Social History
Spring.
Hours to be arranged. J. H. Weiss.

679 Seminar in European History
S. L. Kaplan.

Honors and Research Courses

Note: History 301–302 are not regular courses for which students may sign up at will. They are personal arrangements between an instructor and a particular student. Students must first gain the consent of a particular instructor to work with them.

301 Supervised Reading
Fall or spring. 2 credits.
Open only to upperclass students. Prerequisite: permission of instructor.

302 Supervised Research
Fall or spring. 3 or 4 credits. Open only to upperclass students.
Prerequisite: permission of instructor.

400 Honors Proseminar
Fall or spring. 4 credits. Limited to 15 students. For prospective honors candidates in history. Prerequisite: permission of instructor.
An introduction to historical thinking and historical method. Readings include Carr, Collingwood, Bloch, Ballyn, Braudel, Gibbon, and Spence. Written assignments consist of a few brief commentaries and a long paper on the work of one historian.
An examination of major approaches to historical inquiry and analysis. Masterworks of historical writing (traditional as well as recent) will be discussed. There will be one short essay and a longer paper (a study of the work of one major historian). The readings will be drawn from all time periods and diverse cultures.

401 Honors Research
Fall or spring. 4 credits. Prerequisites: History 400 and permission of instructor.

402 Honors Thesis
Fall or spring. 4 credits. Prerequisites: History 400 and permission of instructor.

703–704 Supervised Reading
703, fall: 704, spring. 4 credits each term. Limited to graduate students. Prerequisite: permission of instructor.

709 Introduction to the Graduate Study of History
Fall. 4 credits. Required of all first-year graduate students.
The course is designed to introduce entering graduate students to the process of studying and problems in historiography that cut across various areas of specialization.

History of Art


The visual arts—painting, sculpture, and architecture—are a principal mode of human expression. Art historians investigate works of art to understand them in their artistic, historical, and cultural contexts. Courses offered by the department cover the mainstream of Western art (classical, medieval, Renaissance, baroque, and nineteenth and twentieth century) and non-Western art, including such conventional categories as painting, sculpture, and architecture, as examined. Students are introduced to the problems of perceiving such objects and appreciating the visual experience. The course is organized by theme and media rather than chronology, and it is a supplement, not a prerequisite, to art history.

101 Purposes of Art
Fall. 3 credits.
The class will approach questions about art's purposes in human society from two different directions: by considering the multiple relationships involved in visual communications and by studying the theoretical art has had in several Western and non-Western societies. Both approaches will entail close examination of selected works of art.

103 Freshman Writing Seminar
Fall or spring. 3 credits. Not open to students who have taken History of Art 104.
Fall: M 2:30–4:30. E. Dotson.
The seminar will introduce students to the problems of perceiving such objects and appreciating the visual experience. The course is organized by theme and media rather than chronology, and it is a supplement, not a prerequisite, to art history.

104 How to Look at Works of Art
Fall. 3 credits. Not open to students who have taken History of Art 103.
Fall: M 2:30–4:30. E. Dotson.
Several major works of art, primarily paintings, are examined in detail. The cultural and historical contexts in which the works were created and their unique qualities as works of art are considered.

105 Traditions in Japanese Art
P. Graham.
and selected books of the Bible, and we will examine
or from the Bible. In this seminar we will read major
Southeast Asia

[106 Art in a Landscape: Traditional Arts in

[107 Principles of Architecture 3 credits. Not

112 Pictorial Narrative Fall. 3 credits.

From the fifteenth through the seventeenth centuries in
Europe the subjects of painting and sculpture were
primarily drawn from the canon of great literature,
whether from texts written in Greek and Roman antiquity
or from the Bible. In this seminar we will read major
portions of Virgil's Aeneid, Ovid's Metamorphoses,
and selected books of the Bible, and we will examine
works of art inspired by those texts. The artists studied
will include Giotto, Piero della Francesca, Michelangelo,
Caravaggio, Bernini, Rubens, and Rembrandt. Through
seven short papers and weekly reading assignments
the class will concentrate on developing skills in textual
analysis and visual analysis as well as in written
expression.

Courses

220 Introduction to Art History: The Art of the
Classical World (also Classics 220) Spring. 3 credits.
M W F 10:10 J. J. Coleman.
The archaeology of the ancient Greeks and Romans as
seen from a critical perspective. Major developments in
Classical archaeology will be traced from treasure
hunting to modern research. Examples illustrating various
approaches will be chosen: sculpture, vase painting, and
architecture of the ancient Greeks from the Geometric period through the
Hellenistic; and the art of the Romans from the early
Republic to the late Empire.

221 Introduction to Art History: Minoan-
Mycenaean Art and Archaeology (also Classics
221 and Art and Archaeology 221) Fall. 3 credits. Students
may not obtain credit for both this course and Classics
319.
M T W 10–11.25 P. Kuniholm.
The birth of civilization in Greece and the Aegean
islands during the Bronze Age. The main focus is on
the rise and fall of Minoan Crete and Mycenaean
Greece, with consideration given to the nature and
significance of Aegean interactions with Egypt, the
Near East, and Anatolia.

230 Introduction to Art History: Monuments
of Medieval Art Spring. 3 credits.
M W F 12:20 R. Cahins.
An introduction to the approaches to art history through a
survey of selected works of art from the Middle Ages:
architecture, sculpture, painting, manuscript
illumination, metal work, and ivory.

245 Introduction to Art History: Renaissance and
Baroque Art Fall. 3 credits. Not open to students who
have taken History of Art 240 or 250.
M W 10:10; disc to be arranged. C. Lazzaro,
S. McGee.
A survey of selected works of European painting,
sculpture, and architecture from 1400 to 1700. The artists
considered include Botticelli, Michelangelo, Rembrandt,
Velazquez, and Bernini. These and other
major artists will be emphasized and viewed through
the context of the principal trends and ideas of the time.
In addition to distinguishing artists' styles and aesthetic
concerns, the course will consider other cultural factors
shaping the work of art, such as patronage, religion,
politics, and economics.

260 Introduction to Art History: The Modern Era
Spring. 3 credits. Not open to students who have taken
History of Art 260.
A topical discussion of some of the major artists,
movements, and ideas that make up the modern age. Emphasis is on European art of the nineteenth and
twentieth centuries.

270 Introduction to Art History: American Art
T. W. Leavitt.

280 Introduction to Art History: Asian Traditions
Fall. 3 credits.
Designed to introduce students to the varied responses of the Asian artist in different social and geographical
contexts. By selective focus and emphasis rather than
broad survey, the student will gain some familiarity with
the Javanese shadow-puppet theater, high-fired
ceramics, Chinese styles of shape painting, the Buddhist
sculpture and painting of Thailand, Indian miniature
paintings, and Japanese prints. A number of the class
sessions will meet in the Herbert F. Johnson Museum of
Art.

290 Introduction to Art History: Architecture and
T. M. Brown.

319 Minoan-Mycenaean Art and Archaeology
J. Coleman.

320 The Archaeology of Ancient Greece (also
J. Coleman.

321 The Archaeology of Cyprus (also Classics

322 Arts of the Roman Empire (also Classics
A. Ramage.

323 Painting in the Greek and Roman World (also

324 Architecture in the Greek and Roman World

325 Greek Vase Painting (also Classics 325) Fall.
4 credits.
M W F 9:05 A. Ramage.
A stylistic and iconographical approach to an art in which
the Greeks excelled. The course will be arranged chronologically from the early (eleventh
century B.C.), anonymous beginnings to the “personal"
hands of identification of the fifth and fourth
centuries B.C. Styles other than Attic will be stressed.

326 Art and Archaeology of Archaic Greece (also

327 Greek and Roman Coins (also Classics 327)
Spring. 4 credits. Prerequisite: permission of instructor.
M 2:30–3:30; lab to be arranged. P. Kuniholm.
The varied issues of Greek cities and the Roman state are
examined. Coins are considered as art objects as
well as economic and historical documents. The
changes in design, value, and metals from the origins
of coinage to the late Roman period are studied.
Lectures, student presentations, and work with actual
examples.

328 Greeks and Their Eastern Neighbors (also
A. Ramage.

329 Greek Sculpture (also Classics 329) Spring.
4 credits.
This course will examine ancient Greek sculpture, both
in two-dimensions, from the Archaic period to the Hellenistic.
We will study various aspects of the works: technological advances in
handling materials, the changing ideology of the
carvers, regionality of styles, and taste of individual
patrons. Sculptures of marble and bronze will be
considered, and comparisons with other ancient
civilizations that influenced the Greeks will be
undertaken.

330 Art in Pompeii: Origins and Echoes (also

332 Architecture in the Middle Ages (also
Architecture 332) Fall. 4 credits.
A survey of medieval architecture from the early
Christian period to the late Gothic (A.D. 300–1500).
Considerable emphasis will be placed on the
development of structural systems and on the form,
function, and meaning of important medieval buildings.

333 Early Medieval Art and Architecture Spring.
4 credits.
Sculture, painting, and architecture in the period from
the late antique through the Carolingian era (A.D. 300–
900). The evolution of the Byzantine tradition will also
be considered.

334 Romanesque Art and Architecture Not
R. G. Cahins.


336 Prelude to the Italian Renaissance 4 credits.
R. G. Cahins.

337 The Medieval Illuminated Book 4 credits.
R. G. Cahins.

341 Flemish Painting 4 credits. Not offered 1987–
88.

342 Medieval and German Renaissance Art
R. G. Cahins.

343 Italian Renaissance of the Fifteenth Century
C. Lazzaro.

344 Italian Renaissance of the Sixteenth Century:
Leonardo, Michelangelo, and Raphael
C. Lazzaro.

350 The Culture of the Early Renaissance (also
Romance Studies 361 and Comparative Literature
361) Fall. 4 credits.
T R 11:40–12:30; disc to be arranged. C. Lazzaro
and E. Morris with collaborator: Spring M. Michel
(Romance studies), D. Randel (music), and
G. Teskey (English).
Renaissance culture and society are introduced through
the work of several major figures: Petrarch, Alberti,
Dufty, Leonardo, Machiaveli, Erasmus, and
Rabelais. Each figure will be the focal point for a critical
examination of problematic issues in the areas of
humanism, religious and political thought, literature, art,
music, and architecture. In the discussion sections
problems of interpretation will be approached through
the analysis of primary source readings and works of art.

351 The Culture of the Later Renaissance (also
Comparative Literature 362 and History 364)
Spring. 4 credits.
T R 11:40–12:30; disc, R or F 1:25 E. G. Dotson,
C. Kaske.
Although History of Art 350 (also Romance Studies 361
and Comparative Literature 361) is not a prerequisite,
this course continues its organization and deals with the
immediately succeeding period. Members of
various departments will lecture on Luther, Dürer,
Michelangelo, Montaigne, Erasmus, Michelangelo,
Montaigne, Erasmus, Michelangelo, and Montaigne,
and will present methods of interpretation and of
historical analysis. Written requirements: two short
papers and a final examination.


361 Nineteenth-Century European Art Fall. 4 credits. Prerequisite: History of Art 250 or 261. M W F 11:15. L. L. Meixner.
A study of the major movements in nineteenth-century art history: neoclassicism, romanticism, realism, impressionism, postimpressionism, and symbolism. The primary artists discussed include Jacques-Louis David, Eugene Delacroix, Francisco Goya, Caspar D. Friedrich, Joseph W. M. Turner, Claude Monet, Vincent van Gogh, and Paul Gauguin. Literary and political developments are examined with respect to the broader cultural contexts of the specific art movements.

An examination of the major movements in European art during the first half of the twentieth century: fauvism, German expressionism, cubism, and its satellite schools, dada, and surrealism. Emphasis will be placed on major artists, including Matisse, Picasso, Klee, van Doesburg, and Duchamp. Relevant political background influencing the period is included as well.


386 Art from 1940 to the Present Fall. 4 credits. T R 11:40--12:55. J. Bernstock.
Major movements and figures working in the United States since 1940, beginning with abstract expressionism and continuing to conceptual art, feminist art, and neo-expressionist art. Some attention is devoted to the critical reception that artists have received, but major emphasis is on the artists’ statements themselves.

A historical and critical survey of the architecture of Washington. Attention will be given to the periods, styles, architects, and clients—public and private—of the notable buildings and to the urban landscape of the nation’s capital. The vocabulary of architectural analysis and criticism will be taught. Field trips required.


381 Buddhist Art in Asia 4 credits. Not offered 1987--88.
S. J. O’Connor.

M. W. Young.

384 The Arts of Japan Fall. 4 credits. M W 10:10; disc to be arranged. P. Graham.
A general overview of the arts of Japan, intended to introduce the student to the cultural achievements of the Japanese in such areas as architecture, gardens, painting, and sculpture. Although the course will follow a general chronological pattern, the arts will be approached topically, with special concentration on developments in the postmedieval period. The tea ceremony, ceramics, and the minor arts will receive particular attention through study of the Herbert F. Johnson Museum collection. The course will begin with an examination of Japan’s earliest pottery traditions and end with a detailed discussion of the wood-block prints of the nineteenth century. The museum collection will be used for written assignments.

385 Chinese Painting Fall. 4 credits. M W 10:10; disc to be arranged. M. W. Young.
An introduction to the arts of China from the medieval period to the modern age. The course focuses on developments in the art of painting, especially landscapes, but related arts such as ceramics, architecture, and sculpture are discussed. Discussion sections use the collection of the Herbert F. Johnson Museum of Art. Term paper option for the final exam.


A survey of the major movements and schools of Japanese painting from the earliest times through the present, elucidating Chinese and Western influences as well as indigenous trends. Topics emphasized will be the development of painting in the service of Buddhism from the seventh through the thirteenth century; the yamato-e, or native tradition of painting; Zen painting in the medieval age; large-scale paintings for interior decoration of samurai dwellings; and the diversity of painting styles and schools of the recent past (from the seventeenth through the nineteenth century).

The arts of Southeast Asia will be studied in their social context, since in traditional societies art plays a role in most of the salient occasions of life. Special emphasis will be devoted to developments in Cambodia, Thailand, and Bali. Among topics covered will be the shadow-puppet theater of Java, ceramics, architecture, and sculpture.

Seminars
Courses at the 400 and 500 level are open to upperclass students, majors, and graduate students. All seminars involve the writing and presentation of research papers. Enrollment is limited to 15 students, and permission of the instructor is required. Students may repeat courses that cover a different topic each semester.

This is a course expected of junior majors in the field of art history. It will serve a dual purpose. On the one hand, it will provide intensive training in the skills of visual analysis, analytic thinking, and writing. Five papers will be assigned, each addressing a different variety of art historical writing. On the other hand, the course will provide a basic introduction to the historiography of the field and to the various modes of inquiry that have been adopted for the study of the visual arts and architecture. Readings will include Heinrich Wolfflin, Walter Pater, Roger Fry, Richard Krautheimer, Rudolph Wittkower, and Erwin Panofsky.

401 Independent Study Fall or spring. 2--4 credits. May be repeated for credit. Prerequisite: permission of a department faculty member. Hours to be arranged. Staff.
Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department.

402 Independent Study Fall or spring. 2--4 credits. May be repeated for credit. Prerequisite: permission of a department faculty member. Hours to be arranged. Staff.
Individual investigation and discussion of special topics not covered in the regular course offerings, by arrangement with a member of the department.

404 Women Artists (also Women’s Studies 404) Fall. 4 credits. Prerequisite: permission of instructor. T 2:30--4:30. J. E. Bernstock.
This seminar will be devoted to a study of the work of women artists from antiquity to the present. The works of the most important women artists from each period will be studied in relation to the changing roles of women in society and to the art produced contemporaneously by men. The artists to be studied include Sofonisba Anguissola, Artemisia Gentileschi, Elizabeth Vigee-Lebrun, Mary Cassatt, Käthe Kollwitz, Georgia O’Keeffe, Louise Nevelson, Helen Frankenthaler, Judy Chicago, and Audrey Flack.


407 Seminar on Museum Issues Fall. 4 credits. Prerequisite: permission of instructor. M 2:30--4:30. T. W. Leavitt.
This course will explore the issues, ideas, problems, and opportunities faced by art museums in contemporary American society. The nature of museum research, the theory of museum education, connoisseurship, effective museum leadership, and the role of art museums in American cultural life will be discussed.

421 History of Art Criticism Spring. 4 credits. Prerequisite: permission of instructor. M 2:30--4:30. S. J. O’Connor.
An introduction to the work produced by some of those art critics who had a powerful impact on the way their contemporaries perceived, valued, and discussed art. Representative works will be studied with attention both to the critic’s central aesthetic concerns and to characteristic qualities of argument and expression. Among the critics to be considered will be Fromentin, Reynolds, Ruskin, Peter, Baudelaire, Fry, Bell, and Greenberg.


427 Seminar on Roman Art Fall. 4 credits. Prerequisite: permission of instructor. T 2:30--4:30. A. Ramage.
Topics for fall 1987: portraiture and biography. Styles in Roman portraiture will be examined from its beginnings in the Etruscan period to its transformation in early Byzantine times. We will also consider accounts of the subjects’ lives and appearances to see if they have colored the appreciation of the sculptors’ work or might be used for better understanding of the representative of well-known people.

431 Greek Sculpture (also Classics 431) 4 credits. Not offered 1987--88. A. Ramage.
432 Sardis and the Cities of Asia Minor (also Classics 432) 4 credits. Not offered 1987–88.
A. Ramage, P. Kunihom.


C. Lazzaro.

449 Studies in Italian Renaissance Art 4 credits.
C. Lazzaro.

C. Lazzaro.

Prerequisite: permission of instructor.
The revolution in realist painting brought about by Caravaggio at the outset of the seventeenth century had repercussions throughout Europe for subsequent generations of artists. This seminar will first analyze Caravaggio's innovation, and the problems of interpretation raised by his works, and then examine his effects on subsequent generations of artists. The students will probe into the nature of humanism in modern art— as it is manifested in the works of Italian, French, Dutch, and Spanish artists who were drawn to or reacted against his painting.

L. Meixner.

463 Studies in Modern Art Fall 4 credits.
Prerequisite: permission of instructor.
W 2:30–4:30, L. L. Meixner.
Topic for fall 1987: Marcel Duchamp and his influence in America. This seminar addresses the complex mind and art of Marcel Duchamp. The multifaceted nature of his oeuvre is explored by focusing on The Bride Stripped Bare by her Bachelors, Even, and other major Duchamp works in the collection of the Philadelphia Museum of Art. His pervasive influence on American modernism is traced from his earliest followers, including Man Ray, Morton Schamberg, John Covert, and Katherine Dreier, through his vital contributions to pop art, earth art, and conceptual art. Andy Warhol, Robert Smithson, Eleanor Antin, and Robert Morris are among the more recent American artists discussed.

464 Studies in Modern Art Spring 4 credits.
Prerequisite: permission of instructor.
T 2:30–4:30, J. Bernstock.
Topic for spring 1988: the figure in art from 1940. This course will consider the significance of, and various roles played by, the figure in art produced from 1940 to the present. Despite successive periods of abstraction and formalism, the figure has retained its importance as a vehicle of expression for artists. The focus will be on the nature of humanism in modern art—as it is manifested in a resurgence of figurative paintings—and its relation to abstraction, naturalism, and realism. Among the artists to be included are Francis Bacon, Jean Dubuffet, Eric Fischl, and Leon Golub.

T. M. Brown.

T. W. Leavitt.

L. L. Meixner.

478 Postimpressionism in France Spring 4 credits. Prerequisite: permission of instructor.
W 2:30–4:30, L. L. Meixner.
The seminar addresses the lively experimentation that characterized French painting in the final decades of the nineteenth century. Capitalizing on the innovations of the impressionists, the postimpressionists developed further inroads to modernism by the following new routes: a heightened scientific awareness of nature, a keen interest in individual psychology and a vigorous commitment to the recording of contemporary life. Georges Seurat, Paul Gauguin, Henri de Toulouse-Lautrec, Edgar Degas, Vincent van Gogh, and their contemporaries are examined with respect to their style, literary sources, social milieu, and autobiographies.

M. W. Young.

S. J. O'Connor.

W. L. Young.

P. Graham.

485 The Ceramic Arts of Japan Fall 4 credits.
Prerequisite: permission of instructor.
The various traditions of Japanese ceramics will be studied historically, topically, and geographically. Among those aspects focused on will be the history of stonewares and their relationship to tea taste, the development of a porcelain industry, folk ceramics, the high-quality craft tradition of Kyoto and its relationship to ceramics produced there, Chinese and Korean influences on Japanese ceramics, and Japanese ceramics in the twentieth century.

M. W. Young.

S. J. O'Connor.

491 Japanese Prints Spring 4 credits.
Prerequisite: permission of instructor.
The history of Japanese printmaking will be explored with emphasis on the ukiyo-e tradition of the seventeenth through the nineteenth century. Also discussed will be book illustrations by non-ukiyo-e school artists and the continuation of printmaking traditions in the twentieth century. Various printmaking techniques will be explained and the connoisseurship of prints will be introduced.

S. McTighe.


510 Problems in Asian Art Fall 4 credits.
Prerequisite: permission of instructor.
Selected traditions of Thai art will be studied using works in the Herbert F. Johnson Museum of Art.

511–592 Supervised Reading 591, fall; 592, spring. 4 credits. May be repeated for credit. Limited to graduate students.
Staff.

535 Problems in Medieval Art and Architecture Fall 4 credits.
Prerequisite: permission of instructor.
M 2:30–4:30, R. G. Calkins.
Topic for fall 1987: methods of medieval art and architecture. An investigation of various approaches to the study and analysis of medieval architecture. Weekly readings, discussions, and a final research paper.

C. Lazzaro.

Indonesian
See Modern Languages, Literatures, and Linguistics.

Italian
See Modern Languages, Literatures, and Linguistics.

Japanese
See Department of Asian Studies, and Modern Languages, Literatures, and Linguistics.

Latin
See Department of Classics.
The Major

The mathematics major adapts to a number of purposes. It can emphasize the theoretical or the applied. It can be appropriate for professionals and nonprofessionals alike. It can be broad or narrow.

Questions concerning the major should be brought to a departmental representative.

For students interested in secondary school teaching there are several programs available, including a five-year B.S. M.A.T. program. These programs are administered jointly by the Departments of Education and Mathematics. For more information, contact Professor D. Henderson (mathematics) or Professor J. Conrey (education).

Prerequisites: The preferred prerequisites are Mathematics 221–222 or 293–294. A unit on infinite series is required. Such a unit is offered in Mathematics 112, 122, and 192. Normally students will be admitted to the major only when they have grades of B– or better in all sophomore-level mathematics courses they have taken. Alternative prerequisites are Mathematics 213, 231, normally with grades of B + or better.

Requirements

There are five requirements for the major:

1) Computer Science 100. Students are urged to take this course before the end of the sophomore year.

2) Two courses in algebra. Eligible courses are Mathematics 431 or 433, 432 or 433 or 332, 336.

3) Two courses in analysis. Eligible courses are Mathematics 411 or 413, 412 or 414, 421, 422, 423, 418.

4) Further high-level mathematical courses. Any one of the following is sufficient:

a) three mathematics courses numbered 371 or higher, other than those used to satisfy the previous two requirements. Computer Science 621 and/or 622 may also be used toward satisfying this requirement.

b) four Computer Science courses numbered 310 or higher

c) four Operations Research and Industrial Engineering courses numbered 320 to 383 or 491 to 472, but not 350.

5) One course dealing with mathematical models. Any one of the following is sufficient:

a) Mathematics 305 (not offered every year).

b) Physics 208, 213, or 214.

c) Computer Science 211, provided no Computer Science course has been used toward satisfying the previous requirement.

d) One course other than Physics 112 or 207 from outside mathematics with serious mathematical content and dealing with scientific matters, provided the course has not been used toward satisfying the previous requirement.

Major advisers can alter these requirements upon request of an advisee, provided the intent of the requirements is met.

Sample Major Programs

Below are some suggestions for what the schedule of a student with a mathematics major might look like. Many variations are possible.

For Graduate School in Mathematics

First two years: Mathematics 111–122, 221–222, Computer Science 100, Physics 207–208.


The sophomore courses Mathematics 221–222 are more suitable than 293–294 in this case. A student planning to enter graduate school may get by with 411–412 and 431–432 instead of the honors versions 413–414 and 433–434, but the honors versions are strongly recommended.

For Many Technical Careers

First two years: Mathematics 111–122, 221–222 or 191–192, 293–294, Computer Science 100–211, Physics 112–213 or 207–208.


Two or more semesters of computer science are highly recommended.

For Emphasis on Computer Science

First two years: Mathematics 111–122, 221–222, Computer Science 100.

Last two years: Mathematics 431–432, 421–422, Computer Science 310, 314, 381, 414, 421.

Requirement 5 is met by Computer Science 381 in this sample program. Students interested in computer science should give consideration to a double major in mathematics and computer science.

For Emphasis on Operations Research

First two years: Mathematics 111–122, 221–222 or 191–192, 293–294, Computer Science 100–211.

Last two years: Mathematics 431–432, 421–422, 471; Operations Research and Industrial Engineering 320, 321, 361; two of 431, 432, 435; and possibly 462 or 471.

For Prelaw or Premed (first example)

First two years: Mathematics 111–122–221–222, Computer Science 100, Physics 207–208.


The sophomore courses Mathematics 221–222 are recommended rather than 293–294 in this sample because they provide better preparation for 411.

For Prelaw or Premed (second example) or Prelaw or Prebusiness

First two years: Mathematics 111–122–213–231, Computer Science 100–211.


A course in statistics is also strongly recommended.

Honors. Honors in mathematics will be awarded on the basis of a high level of performance in departmental courses. Further requirements, if any, will be announced during the year.

Distribution Requirement

The distribution requirement is satisfied in mathematics by any 6 credits, not including more than one course from Mathematics 105, 107, 403. Computer Science 100 may be used for three of these credits. The mathematics distribution requirement is also satisfied by a score of 3 or higher on the CEEB calculus BC examination. Mathematics 109 or ALS 15 (College of Agriculture and Life Sciences) may not be used to satisfy the requirement.

Basic Sequences

Precalculus

Course Numbers

Mathematics

109* or

109

109*

Agriculture and Life Sciences 5*

2) Algebra, analytic geometry, elements of calculus

15**

*A mathematics 109 and ALS 5 do not carry credit for graduation.

**Students who want a second semester of mathematics after ALS 15 may take Mathematics 107 or 105, or if they need more calculus, 111.
Calculus

<table>
<thead>
<tr>
<th>Description</th>
<th>Mathematics Course Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Standard three-semester sequence for students who do not expect to take advanced courses in mathematics</td>
<td>111–112–213</td>
</tr>
<tr>
<td>2) Usual sequence for prospective mathematics majors and others who expect to take advanced courses in mathematics</td>
<td>222</td>
</tr>
<tr>
<td>3) Calculus for engineers</td>
<td>191 (or 193)–(also taken by some physical science majors)</td>
</tr>
</tbody>
</table>

Mathematics 191 (or 193) may be substituted for 111 in sequences 1 and 2. Mathematics 193 is a variant of 191 for engineering students who have had some calculus in high school but have not received advanced placement. Sequences 2 and 3 are two-year sequences that include some linear algebra.

Students who take sequence 1 may learn some linear algebra by taking Mathematics 231: A student whose performance in 112 is exceptional may switch to sequence 2 and take 221.

Special-Purpose Sequences

<table>
<thead>
<tr>
<th>Description</th>
<th>Mathematics Course Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Finite mathematics and calculus for biology majors</td>
<td>105–106</td>
</tr>
<tr>
<td>2) Other possible finite mathematics and calculus sequences</td>
<td>105–111, 107–111</td>
</tr>
</tbody>
</table>

Students who want to take two semesters of calculus are advised to take the first two semesters of one of the three calculus sequences. It is also possible to follow Mathematics 106 with 112 or 122.

Switching between calculus sequences is often difficult, especially at the 200-level. Students should not attempt such a switch without consulting the associate chairman.

Courses with Overlapping Content

Because the department offers many courses with overlapping content, students must choose their courses carefully to ensure that they will receive credit for each course they take. Listed below are groups of courses with similar content. Students will receive credit for only one of the courses in each group.

105 and 107
106, 111, 113, 191, 193
112, 122, and 192
213 and 293
213 and 294
213 and 222
221, 294, and 231
232 and 332
372 and 472

Basic Sequences

105 Finite Mathematics for Biologists (also Theoretical and Applied Mathematics 105) Fall. 3 credits.

Prerequisite: three years of high school mathematics, including trigonometry and logarithms. Lecs, TR 12-20, plus 2 hours to be arranged. Prelims: 7:30 p.m., Sept. 30, Oct. 29, Dec. 3. Mathematical modeling, sets, functions, and graphing (including use of log and semi-log paper). Probability (with some applications to genetics). Matrices, systems of linear equations, and Markov chains. Examples from biology are used.

*See the list of courses with overlapping content at the end of the introduction.

106 Calculus for Biologists (also Theoretical and Applied Mathematics 106) Spring. 3 credits.

Prerequisite: Mathematics 105 or 109 or ALS 115 or permission of instructor. (A strong background in functions and algebra.) Mathematics 111, rather than 106, is recommended for those planning to take 112.* Lecs, TR 11:15, plus 2 hours to be arranged. Prelims: 7:30 p.m., Feb. 23, Mar. 29, Apr. 28. Introduction to differential and integral calculus, partial derivatives, elementary differential equations. Examples from biology are used.

107 Finite Mathematics Fall or summer. 3 credits.

Prerequisite: three years of high school mathematics, including at least two years of high school algebra. This course cannot be used toward fulfillment of the mathematics requirement for biology majors.* Lecs, TR 10:10, plus 2 hours to be arranged. Prelims: 7:30 p.m., Sept. 30, Oct. 29, Dec. 3. Functions, enumeration, permutations and combinations, probability, vectors and matrices, Markov chains.

109 Precalculus Mathematics Summer. 3 transcript credits only; cannot be used toward graduation. M–F 8:30.

This course is designed to prepare students for Mathematics 111. Algebra, trigonometry, logarithms, and exponentials are reviewed.

111 Calculus Fall, spring, or summer. 4 credits.

Limited to 22 students a section. Prerequisite: Mathematics 105 or three years of high school mathematics, including trigonometry.* Hours to be arranged. Prelims: fall, 7:30 p.m., Sept. 30, Oct. 29, Dec. 3; spring, 7:30 p.m., Feb. 23, Mar. 29, Apr. 28. Plane analytic geometry, differentiation and integration of algebraic and trigonometric functions, applications of differentiation, logarithmic and exponential functions.

112 Calculus Fall, spring, or summer. 4 credits.

Limited to 22 students a section. Prerequisites: Mathematics 106, 111, or 113 with a grade of C or better. Those who do extremely well in Mathematics 111 or 113 should take 122 instead of 112, unless they plan to continue with 213.* Hours to be arranged. Prelims: fall, 7:30 p.m., Sept. 30, Oct. 29, Dec. 3; spring, 7:30 p.m., Feb. 23, Mar. 29, Apr. 28.

Methods and applications of integration, plane curves and polar coordinates, vectors and solid analytic geometry, introduction to partial derivatives.


120 Calculus Fall or spring. 4 credits.

Prerequisite: performance at a high level in Mathematics 111 or 113 or permission of the department. Students planning to continue with Mathematics 213 are advised to take 112 instead of this course.


Differentiation and integration of elementary transcendental functions, the techniques of integration, applications, polar coordinates, infinite series, and complex numbers, as well as an introduction to proving theorems. The approach is more theoretical than in Mathematics 112.

191–193 Calculus for Engineers Fall. 4 credits.

Prerequisite: three years of high school mathematics, including trigonometry. Mathematics 193 is a course parallel to 191 for students who have had a substantial amount of calculus in high school but who did not place out of 191. Although the same topics will be covered in Mathematics 193 as in 191, some may be treated in greater depth in 193.* 191: Lecs, M W F 11:15, plus 2 hours to be arranged. 193: Lecs, M W F 9:05 or 11:15, plus 2 hours to be arranged. Prelims: 7:30 p.m., Sept. 30, Oct. 29, Dec. 3.

Plane analytic geometry, differential and integral calculus, applications.

192 Calculus for Engineers Fall, spring, or summer. 4 credits.

Prerequisite: Mathematics 191 or 193.* Fall: Lecs, M W F 9:05 or 11:15, plus 2 hours to be arranged. Spring: Lecs, M W F 9:05 or 11:15, plus 2 hours to be arranged. Prelims: fall, 7:30 p.m., Sept. 30, Oct. 29, Dec. 3; spring, 7:30 p.m., Feb. 23, Mar. 29, Apr. 28.

Methods of integration, polar coordinates, vectors and parameter equations, vector functions of one variable, infinite series, complex numbers, introduction to partial derivatives.

213 Calculus Fall, spring, or summer. 4 credits.

Prerequisite: Mathematics 112, 122, or 192.

Lecs, M W F 10:10, plus 2 hours to be arranged. Prelims: fall, 7:30 p.m., Sept. 30, Oct. 29, Dec. 3; spring, 7:30 p.m., Feb. 25, Mar. 29, May 3.


221 Linear Algebra and Calculus Fall or spring. 4 credits.

Prerequisite: Mathematics 213.


Vector calculus, calculus of functions of several variables, multiple integrals.

293 Engineering Mathematics with Microcomputers Fall or spring. 4 credits.

Prerequisites: Mathematics 192 plus a knowledge of computer programming equivalent to that taught in Engineering Common Courses 105. In exceptional circumstances, Mathematics 192 and 293 may be taken concurrently.*

Fall: Lecs, M W F 10:10, 11:15, or 12:20, plus one hour to be arranged, plus four three-hour computer labs during the semester. Spring: Lecs, M W F 10:10 or 12:20, plus one hour to be arranged, plus four three-hour computer labs during the semester. Prelims: fall, 7:30 p.m., Sept. 22, Oct. 29, Dec. 3; spring, 7:30 p.m., Feb. 25, Mar. 29, May 3.

Partial derivatives, multiple integrals, first- and second-order ordinary differential equations with applications in the physical and engineering sciences. Includes microcomputer experiments using computer algebra to solve problems.

294 Engineering Mathematics with Microcomputers Fall or spring. 4 credits.

Prerequisites: Mathematics 293.*

Fall: Lecs, M W F 10:10 or 12:20, plus one hour to be arranged, plus four three-hour computer labs during the semester. Spring: Lecs, 10:10, 11:15, or 12:20, plus one hour to be arranged, plus four three-hour computer labs during the semester. Prelims: fall, 7:30 p.m., Sept. 22, Oct. 29, Dec. 3; spring, 7:30 p.m., Feb. 25, Mar. 29, May 3.

Vector spaces and linear algebra, matrices, eigenvalue problems, and applications to systems of linear differential equations. Vector calculus, Boundary-value problems and introduction to Fourier series. Includes microcomputer experiments using computer algebra to solve problems.
General Courses

101 History of Mathematics  
Summer. 4 credits.  
Prerequisite: three years of high school mathematics. The history of the main ideas of mathematics from Babylonian, Egyptian, and Greek times to the present day.

150 From Space to Geometry  
Fall. 4 credits.  
Enrollment limited to 18 students. Over the centuries mathematicians have interpreted the concept of "space" in numerous ways. This course will survey some of these approaches from the time of Euclid to the later perspective of non-Euclidean systems. We will evaluate the impact of these viewpoints on such concepts as distance, angle measurement, straightness and curvature, dimension, and surface. We will make and analyze models to get a feel for the concepts and to assess the relevance of various approaches to geometry.

305 Mathematics in the Real World  
Summer. 4 credits.  
Selected uses of mathematics to solve current relevant problems; illustration of, and active student involvement in, the complete applied mathematical methodology.

401 Honors Seminar  

403 History of Mathematics  
Spring. 4 credits.  
Prerequisites: two courses in mathematics above 300, or permission of instructor.

Mathematics

421 Applicable Mathematics  
Fall, spring, or summer. 4 credits.  
Prerequisites: high level of performance in Mathematics 294, or 221 and 222, or 213 and 231. Graduate students who need mathematics extensively in their work and who have had a solid advanced calculus course and complex variables course as undergraduates should take Mathematics 515–516. With less preparation, they should take Mathematics 421–422–423.

422 Applicable Mathematics  
Fall, spring, or summer. 4 credits.  
Prerequisites: Mathematics 421.  

423 Applicable Mathematics  
Fall or spring. 4 credits.  
Prerequisite: Mathematics 421, however, students who have not taken 422 should talk to the instructor before taking this course.

424 Applicable Mathematics  
Fall or spring. 4 credits.  
Prerequisite: Mathematics 421, however, students who have not taken 422 should talk to the instructor before taking this course.

425 Numerical Solutions of Differential Equations  
Spring. 4 credits.  
Prerequisites: Mathematics 222 or 294.  
One course numbered 300 or higher in mathematics or computer science 221, or permission of instructor.

451, fall or spring. 4 credits each term.  
Prerequisite: Mathematics 222. Students who need measure theory and Lebesgue integration for advanced probability courses should take Mathematics 413–414 or arrange to audit the first few weeks of Mathematics 521. Undergraduates who plan to attend graduate school in mathematics should take 413–414.

452 Applicable Algebra  
Fall, spring, or summer. 4 credits.  
Prerequisite: Mathematics 431, however, students who have not taken 432 should talk to the instructor before taking this course.

453 Introduction to Topology  
Fall 4 credits.

Algebra

231 Linear Algebra  
Spring or summer. 3 credits.  
Prerequisite: one year of calculus.

451-452 Classical Geometries  
Fall, spring. 4 credits each term.  
Prerequisite: Mathematics 221 or 231 or permission of instructor.

453 Introduction to Topology  
Fall. 4 credits.  
Prerequisites: Mathematics 411 and 221, or permission of instructor.
Basic point set topology: connectedness, compactness, metric spaces, fundamental group. Application of these concepts to surfaces such as the torus, the Klein bottle, the Moebius band.

454 Introduction to Differential Geometry
Spring
4 credits. Prerequisite: Mathematics 222 or 294, plus at least one mathematics course numbered 300 or above. Mathematics 453 is not a prerequisite. M W F 12:20. Differential geometry of curves and surfaces. Curvature, geodesics, differential forms. Introduction to n-dimensional Riemannian manifolds. This material provides the background for the study of general relativity; connections with the latter will be indicated.

Probability and Statistics
372 Elementary Statistics
Fall
4 credits. Prerequisites: one year of calculus, and Computer Science 100 or 101 or 108 or permission of instructor. A terminal course for students who will take no further courses in statistics. M W F 9:05. Evening prelims may be given. Introduction to the principles underlying modern statistical inference, to the practical application of statistical techniques, and to the rationale underlying the choice of statistical methods in various situations. Topics in probability that are essential to an understanding of the subject are presented. Homework involves statistical analysis of data sets on hand calculators and on a computer by means of packaged programs.

471 Basic Probability
Fall
4 credits. Prerequisite: Mathematics 221. May be used as a terminal course in basic probability if intended primarily for those who will continue with Mathematics 472. Lecs, M W F 11:15-12:05, R 12-12:50. Prelims: 7:30 p.m., Oct. 8, Nov. 19. Topics include combinations, important probability laws, expectations, moments, moment-generating functions, limit theorems. Emphasis is on diverse applications and on development of use in statistical applications. See also the description of Mathematics 571.

472 Statistics
Spring
4 credits. Prerequisite: Mathematics 471 and knowledge of linear algebra such as taught in Mathematics 221. Some knowledge of multivariate calculus helpful but not necessary. M W F 9:05. Prelims: 7:30 p.m., Mar. 8, Apr. 19. Classical and recently developed statistical procedures are discussed in a framework that emphasizes the basic principles of statistical inference and the rationale underlying the choice of these procedures in various settings. These settings include problems of estimation, hypothesis testing, large sample theory.

473 Further Topics in Statistics
Fall

Mathematical Logic
461 Mathematical Logic
Spring

*See the list of courses with overlapping content at the end of the introduction.

486 Applied Logic (also Computer Science 486)
Spring or summer
4 credits. Prerequisite: Mathematics 222 or 294. Computer Science 100, and some additional course in mathematics or theoretical computer science. T R 10-11:25 plus one-hour lab to be arranged. Propositional and predicate logic, compactness and completeness by tableau. Equational logic. Herbrand Universes, the resolution method, and unification. Rewrite rules and equational logic Knuth-Bendix method and the congruence closure algorithm and λ-calculus reduction strategies. Restrictions on resolution and their completeness. Introduction to automatic theorem proving. Topics in Prolog, Lisp, or ML on microcomputers or possibly exposure to a larger system such as Nuprl. Input resolution and Prolog. Applications to expert systems and program verification.

Graduate Courses
Students interested in taking graduate courses in mathematics should consult the department for further course details, times, and possible changes in courses as described below.

503 History of Mathematics
4 credits. Prerequisites: Mathematics 451 and 452. Intended for graduate students in the mathematical sciences. Not offered 1987-88. This course will be devoted to the history of mathematics in century from the original sources, with emphasis on the history of the foundations of algebra and of the foundations of commutative algebra. Typical authors in algebra who will be studied include Lagrange, Ruffini, Gauss, Abel, Galois, Dirichlet, Kummer, Kronecker, Dedekind, Weber, M. Noether, Hilbert, Steinitz, Artin, and E. Noether. Typical authors in analysis who will be studied are Cauchy, Fourier, Weirstrauss, Heine, Cantor, Peano, and Hilbert. If time permits, a sketch will be given of the history of probability and statistics from Bernoulli to Pearson. Students will be required to read and explain one important nineteenth-century paper.

511-512 Real and Complex Analysis
Fall, Spring
511, fall; 512, spring. 511: measure and integration, functional analysis; 512: complex analysis, Fourier analysis, and distribution theory.

513-514 Topics in Analysis
Spring
513, fall; 514, spring.

515-516 Mathematical Methods in Physics
Spring
515, fall; 516, spring. 4 credits each. Intended for graduate students in physics or related fields who have had a strong advanced calculus course and at least two years of general physics. A knowledge of the elements of dimension vector space theory, complex variables, separation of variables in partial differential equations, and Fourier series will be assumed. The course overparts with Mathematics 421-422-423. Undergraduates will be admitted only with permission of instructor. Mathematics 515 is a prerequisite for 516. M W F 12:20-1:25.

517-518 Ordinary Differential Equations
Spring

521 Measure Theory and Lebesgue Integration
Fall
Measure theory, integration, and L^p spaces.

522 Applied Functional Analysis
Spring
Spectral theorem for compact operators, spectral theory for unbounded operators in Hilbert space, compact operators, distributions. Applications.

531-532 Algebra
531, fall; 532, spring. 531: finite groups, field extensions, Galois theory, rings and algebras, tensor and exterior algebra. 532: Wedderburn structure theorem. Brauer group, group cohomology, Dedekind domains, primary decomposition. Hilbert basis theorem, local rings.

537 Elementary Number Theory
Fall
Prerequisites: Mathematics 432 and 412. Introduction to number theory suitable for first-year graduate students and advanced undergraduates. Choice of topics discussed depends on the instructor. In previous years the text has been A Course in Analytic Number Theory by J. P. Serre. The topics covered have included quadratic forms, quadratic reciprocity, and modular forms.

549 Lie Groups and Differential Geometry
Fall
551 Introductory Algebraic Topology
Spring
Fundamental group and covering spaces. Homology theories for complexes and spaces.

552 Differentiable Manifolds
Fall
Prerequisites: advanced calculus and some elementary point-set topology. Typical authors in algebra include Lagrange, Ruffini, Gauss, Abel, Galois, Dirichlet, Kummer, Kronecker, Dedekind, Weber, M. Noether, Hilbert, Steinitz, Artin, and E. Noether. Typical authors in analysis who will be studied are Cauchy, Fourier, Weirstrauss, Heine, Cantor, Peano, and Hilbert. If time permits, a sketch will be given of the history of probability and statistics from Bernoulli to Pearson. Students will be required to read and explain one important nineteenth-century paper.

561 Geometric Topology
Topics from general topology. Introduction to geometric properties of manifolds.

571-572 Probability Theory
Fall, Spring

571-574 Probability and Statistics
Fall, Spring
571, fall; 574, spring. This course is a prerequisite to all advanced courses in statistics.

571 same as Mathematics 571 above. 574: Topics include an introduction to the theory of point estimation, consistency, efficiency, sufficiency, and the method of maximum likelihood; the classical tests of hypotheses and their power; the theory of confidence intervals; the basic concepts of statistical decision theory; the fundamentals of sequential analysis. Intended to furnish a rigorous introduction to mathematical statistics.

573 Experimental Design, Multivariate Analysis
Fall
Rationale for selection of experimental designs and algorithms for constructing optimum designs. Optimum properties and distribution theory for classical analysis of variance procedures and their simplest multivariate analogues.
[661–662] Seminar in Geometry


A course taught occasionally to cover special topics in theoretical statistics not treated in other listed courses. Typical of the subjects that will be treated are time-series analysis, and classification and cluster analysis.

[671–672] Seminar in Probability and Statistics


[675] Statistical Decision Theory Spring.

[677–678] Stochastic Processes 677, fall; 678, spring.

[681–682] Seminar in Logic 681, fall; 682, spring.


[684] Recursion Theory Fall.

[685] Metamathematics Fall.
Topics in metamathematics. Course content varies.

[687] Set Theory Spring.
Models of set theory. Theorems of Gödel and Cohen, recent independence results.

[688] Topics in Applied Logic Fall.
This course will cover selected topics in applied logic chosen for their relevance to computer science. The exact topics will change from year to year. In 1986 we expect to include (1) models of the lambda calculus and the denotational semantics of programming languages; (2) the second-order, polymorphic lambda calculus (Girard, Reynolds) and its extension to a theory of constructions (Huet, Coquand); (3) constructive logics based on the theory of constructions; (4) formal specification languages; (5) proofs of software correctness; (6) techniques of automatic theorem proving.

Modern Languages and Linguistics

J. Jasanoff, acting chairperson (Department of Modern Languages and Linguistics); J. Bowers, associate chairperson (311 Morrill Hall); W. Harbert, graduate faculty representative (214 Morrill Hall); J. Gair, director of undergraduate studies (407 Morrill Hall); L. Babby, W. Browne, G. Chiechica, N. Clements, G. Diffloth, J. Grimms, J. Huang, G. Kelley, J. Kingston, H. Kuhner, F. Landman, R. Leed, S. McConnell-Ginet, J. Noblit, A. Nussbaum, C. Rosen, C. Shih, D. Solá, M. Suher, F. van Coetsem, L. Whitman, J. Wolff.

The Department of Modern Languages and Linguistics offers courses in linguistics (the study of the structure of language) and elementary, intermediate, and advanced courses in the minor as well as the major languages of Europe and south, southeast, and east Asia. Students take these courses because they are interested in the area in which the language is spoken.

Modern Languages, Literatures, and Linguistics

Courses in modern languages, literatures, and linguistics are offered by various departments of the college. Most courses in modern languages and linguistics are offered by the Department of Modern Languages and Linguistics (see Linguistics, pp. 000–000). Literature courses, and certain language courses as well, are taught by the following departments:

African Studies and Research Center: Swahili
Asian Studies: Chinese, Japanese
Classics: Greek, Latin
German Literature: German
Near Eastern Studies: Akkadian, Arabic, Aramaic, Hebrew
Romance Studies: French, Italian, Portuguese, Spanish
Russian Literature: Russian

The Full-Year Asian Language Concentration (FALCON Program) offers intensive instruction in Chinese, Japanese, or Indonesian to students wishing to gain fluency in the language in a single year.

Arabic


[211–212] Intermediate Arabic 211, fall; 212, spring. 3 credits each term. See further listings under Near Eastern Studies.

Bengali

121–122 Elementary Bengali 121, fall; 122, spring. 4 credits each term. Prerequisite: for Bengali 122, Bengali 121 or examination.

To be arranged. B. MacDougall and staff.

The emphasis is on basic grammar, speaking, and comprehension skills; Bengali script will also be introduced.

203–204 Continuing Bengali 203, fall; 204, spring. 3 credits each term. Prerequisites: for Bengali 203, Bengali 122 or examination; for Bengali 204, Bengali 203 or examination.

To be arranged. B. MacDougall and staff.

Continuing instruction in grammar with attention to speaking and reading skills.

Burmese

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Burmese 102: Burmese 101 or equivalent.

To be arranged. G. Diffloth.

A semi-intensive course for beginners or for those who have been placed in the course by examination. Gives a thorough grounding in all the language skills: listening, speaking, reading, and writing.

201–202 Burmese Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Burmese 201, qualification in Burmese; for Burmese 202, Burmese 201.

To be arranged. G. Diffloth.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Burmese 203, qualification in Burmese; for Burmese 204, Burmese 203.

To be arranged. G. Diffloth.
Advanced Burmese Reading  301, fall; 302, spring. 4 credits each term. Prerequisites: for Burmese 301, Burmese 202 or permission of instructor; for Burmese 302. Burmese 301. Hours to be arranged. G. Diffloth.

Burmese Directed Individual Study  401–402. Fall or spring. 4 credits each term. May be repeated. Prerequisite: permission of instructor. Hours to be arranged. G. Diffloth.


Intermediate Chinese  201, fall or summer; 202, spring or summer. 4 credits each term. Prerequisite: for Chinese 201, Chinese 102 or equivalent; for Chinese 202, Chinese 201. M–F 9:05 or 11:15. Staff.

Intermediate Cantonese  211, fall; 212, spring. 4 credits each term. Prerequisites: for Chinese 211, Chinese 112 or equivalent; for Chinese 212, Chinese 211. Hours to be arranged. E. Leung.

Advanced Chinese  301, fall; 302, spring. 4 credits each term. Prerequisites: for Chinese 301, Chinese 202; or equivalent for Chinese 302, Chinese 301. M W F 11:15. Staff. Readings and drill in modern expository Chinese.

Chinese Conversation  303–304. Fall, 303; spring, 304. 1 credit each term. May be repeated for credit. Prerequisite: Chinese 201–202; S-U grades only. T R 1:25. Staff. Guided conversation and oral composition and translation. Corrective pronunciation drill.

Advanced Cantonese  311, fall; 312, spring. 4 credits each term. Prerequisites: for Chinese 311, Chinese 212; or equivalent for Chinese 312, Chinese 311. Not offered 1987–88. Hours to be arranged. E. Leung.

History of the Chinese Language  401. Fall or spring, according to demand. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. Hours to be arranged. Staff. Survey of phonological and syntactic developments in Chinese.

Linguistic Structure of Chinese I  403. Fall, 4 credits. Prerequisite: permission of instructor. Offered alternate years. Hours to be arranged. C. Shih. Introductory course in the phonology of modern Mandarin Chinese.

Linguistic Structure of Chinese II  404. Spring, according to demand. 4 credits. Prerequisite: permission of instructor. Hours to be arranged. J. Huang. Syntax of modern Mandarin Chinese.

Chinese Dialects  405. Fall or spring, according to student demand. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. Hours to be arranged. Staff. Introductory survey of modern dialects and their distinguishing characteristics.

Readings in Modern Chinese  411–412. Fall, 411; spring, 412. 4 credits each term. Prerequisites: for Chinese 411, Chinese 302 or equivalent; for Chinese 412, Chinese 411. M W F 1:25. Staff.

Chinese Reading Tutorials  413, fall; 414, spring. 2 credits each term. May be repeated for credit. Prerequisite: Chinese 302 or equivalent and permission of instructor. Hours to be arranged. Staff. Individual or small-group guidance in advanced Chinese texts, designed primarily for Asian studies majors taking other courses with reading assignments in Chinese.

Chinese Dialect Seminar  Fall or spring, on student demand. 4 credits. Prerequisite: Chinese 405 and permission of instructor. Not offered 1987–88. Hours to be arranged. Staff. Analysis and field techniques in a selected dialect area.

FALCON

C. Shih, 213 Morrill Hall (255-4230); J. Wheatley, 416 Morrill Hall.

Intensive Mandarin Course  161, fall; 162, spring; 163, spring. 16 credits each term. Prerequisite: for Chinese 161, Chinese 160 (Cornell summer intensive course) or permission of instructor; for Chinese 162, Chinese 161. M–F 6 hours each day. C. Shih, J. Wheatley, and staff.

Foreign language requirement: Proficiency is attained by passing 101.

Literature

Introduction to Classical Chinese  213, fall; 214, spring. 3 credits each term. Prerequisite: qualification in Chinese or permission of instructor. May be taken concurrently with Chinese 101–102, 201–202; 301–302; 401–402. M W F 12:00; T. L. Mei and staff.


T'ang and Sung Poetry  420. Spring, on demand. 4 credits. Prerequisite: permission of instructor. T. L. Mei. Hours to be arranged.

Directed Study  421–422. Fall or spring or both. 2–4 credits each term. Prerequisite: permission of instructor. Staff.

Readings in Literary Criticism  424. Fall or spring, on demand. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. T. L. Mei.

Readings in Folk Literature  430. Fall or spring, on demand. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. Staff.

Note: For complete descriptions of courses numbered 600 or above, consult the appropriate instructor.

Seminar in Chinese Poetry and Poetics  603. Fall or spring, on demand. 4 credits. Prerequisite: permission of instructor.

Seminar in Chinese Fiction and Drama  605. Fall. 4 credits. Prerequisite: permission of instructor. Not offered 1987–88. E. M. Gunn.

Seminar in Chinese Folk Literature  609. Fall or spring, according to demand. 4 credits. Prerequisite: permission of instructor. Staff.

Advanced Directed Reading  621, fall; 622, spring. Credit to be arranged. Prerequisite: permission of instructor. E. J. Gunn, T. L. Mei.
Danish

131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Danish 132, Danish 131 or equivalent. M.W.F 8:00, P. M. Michell.

131–132 Elementary Course 131, fall or summer; 132, spring or summer. 3 credits each term. Prerequisite: permission of instructor. Hours to be arranged. F. van Cootsem.

133–134 Continuing Course 133, fall; 134, spring. Offered according to demand. 3 credits each term. Prerequisites: for Dutch 133, Dutch 132 or equivalent; for Dutch 134, Dutch 133 or equivalent. Hours to be arranged. F. van Cootsem.

Seminar in Dutch Linguistics (German 740)

English

Intensive English Program, see p. 227

205 English as a Second Language Fall. 4 credits. Prerequisite: placement by the instructor. M.T.W.R 10:10. M. Martin.
Intermediate spoken and written English, with emphasis on speaking, understanding, and reading.

206 English as a Second Language Spring. 3 credits. Prerequisite: English 205 or placement by the instructor. M.W.F. 10:10. M. Martin.
Designed for those who have completed English 205 and who require or desire further practice. Emphasis is on developing control of written as well as spoken language.

209 English as a Second Language Fall or spring. 1 credit. Prerequisite: placement by instructor. Hours to be arranged. M. Martin.
Practice in informal conversational English. Pronunciation, techniques for gaining information, informal conversation, and classroom speaking. Students also practice giving informal presentations. Personal conferences with the instructor supplement class work.

210 English as a Second Language Spring. 1 credit. Prerequisite: placement by instructor. Hours to be arranged. M. Martin.
Practice in academic speaking. Formal classroom discussion techniques and presentation of information in various forms. Personal conferences supplement class work.

Advanced writing, with emphasis on improving vocabulary, grammar, and control of college-level written English.

213 Written English for Nonnative Speakers Spring. 3 credits. Prerequisite: placement by the instructor. T R 10:10, plus a weekly conference. M. Martin.
Designed for those whose writing fluency is sufficient for them to carry on regular academic work but who feel the desire for refining and developing their ability to express themselves clearly and effectively. As much as possible, students receive individual attention.

Freshman Writing Seminar

215–216 English for Later Bilinguals 215, fall or summer; 216, spring. 3 credits each term. Not designed for students whose schooling has been mostly in English. Prerequisite for English 216: English 215.

A course designed to strengthen the English-language skills of students from other countries who have studied for one to five years in American high schools and whose language in the home is not English. Intensive work in written English is offered, with emphasis on sentence structure, cohesion, vocabulary expansion, grammatical structure, and mastery of style. Individual conferences on papers supplement class work.

French


The Major

The major in French is designed to give students proficiency in the oral and written language, to acquaint them with French literature and culture, and to develop skills in literary and linguistic analysis.

While prospective majors should try to plan their programs as far ahead as possible, no student will be refused admission merely because of a late start. It is even possible for a student to begin French at Cornell and become a major; students wishing to transfer in French should consult the director of undergraduate studies of the Department of Romance Studies, Professor J. Bertrand, who will admit them to the major. After their admittance students will choose an adviser from among the French faculty. Students interested in the linguistics option should consult Professor L. Waugh, Department of Modern Languages and Linguistics.

The major has a core, required of all majors, and two options that attempt to reflect the variety of student interests yet maintain the focus for a coherent and substantial program of studies.

The Core

1) All majors are expected to acquire a sound degree of competence in language. This competence is demonstrated by the successful completion of French 312 or by the passing of a special examination to be taken no later than the end of the junior year. A typical program will involve two semesters of language at the 200 level (to be taken no later than the end of the sophomore year) and two semesters of language at the 300 level (French 311–312). Students may bypass any part of the sequence through placement examinations.

2) In addition, all majors are expected to take French 201 and 202. At least one of these should be completed successfully no later than the end of the sophomore year.

The Options

The following groups intentionally overlap in part, yet each is intended to emphasize different aspects of French culture.

The literature option

1) The successful completion of six courses in French literature or civilization at the 200 level or above. These courses will be selected in consultation with the student’s major adviser and will normally include at least one course from each of the three major periods of French literature (Medieval to Renaissance, the seventeenth and eighteenth centuries, and the nineteenth and twentieth centuries).

2) The successful completion of two related courses in one of the following: (a) French literature; (b) French linguistics; (c) French history, culture, music, or history of art or architecture; (d) courses in linguistic theory, history of language, psycholinguistics, or philosophy of language.

The linguistic option

1) The successful completion of six courses in French and general linguistics (in addition to Linguistics 101–102). These courses will include at least one course concerning the history of French (e.g., French 401, Romance Languages 311) and one course concerning the structure of French (e.g., French 408, 410, or 602).

2) The successful completion of two courses (preferably a sequence) in some allied area, for example, (a) French literature and civilization, (b) psycholinguistics, (c) philosophy of language, (d) anthropological linguistics.

Whatever option a student chooses, he or she is urged to take advantage of the ample flexibility offered by the French major. Students who want to pursue careers in business, law, medicine, or teaching may coordinate their work with preparoher programs. Similarly, interdisciplinary work is strongly encouraged; students may elect to enrich their major with related courses in history, archaeology, Classics, comparative literature, English and American literature, anthropology, music, history of art, philosophy, government, linguistics, and other literatures and languages.

French majors may study in France for a semester or a year during their junior year under any of the several study-abroad plans that are recognized by the Department of Romance Studies and the Department of Modern Languages and Linguistics and allow for the transfer of credit. The director of undergraduate studies has information about such plans.

Honors.

The honors program encourages well-qualified students to do independent work in French outside the structure of courses. The preparation of the senior honors essay, generally spread over three terms, provides a unique learning opportunity, since it allows for wide reading, careful outlining, and extensive rewriting to a degree not practically possible in the case of course papers. At each stage of their work, the students will have regular weekly meetings with faculty tutors.

No special seminars or courses are required of honors students. For the honors major, independent work (ordinarily two terms) will be devoted to intensive study of selected problems or authors and to the choice of a topic for the honors essay; the senior tutorial is devoted to the writing of that essay. Honors students may be released from one or two courses in either the junior or senior year to have adequate time for honors work.

(Credit is obtained by enrolling in French 419–420.) Students will take an informal oral examination at the end of the senior year. Honors students are selected on the basis of their work in French language and literature courses in the freshman and sophomore years.

Students interested should consult Professor E. Morris (preferably a sequence) in some allied area, for details no later than the spring term of the senior year. Honors students may study in France for a semester or a year during their junior year under any of the several study-abroad plans that are recognized by the Department of Romance Studies and the Department of Modern Languages and Linguistics and allow for the transfer of credit. The director of undergraduate studies has information about such plans.

Fees.

Depending on the course, a small fee may be charged for copies of texts for course work.

Language and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Intended for beginners or students placed by examination. Prerequisite for French 122: French 121 or equivalent. Students who obtain a CPT score of 560 after French 121–122 attain qualification and may enter the 200-level sequence; otherwise French 123 is required for qualification.

Lec. 9:05, 10:10, 11:15, or 1:25; drills, M.W.F 8:05, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30. M. J. Ellis.
A thorough grounding in all the language skills is language practice is in small groups. Lectures cover grammar, reading, and cultural information.

123 Continuing French Fall, spring, or summer 4 credits. Limited to students who have previously studied French and have a CPT achievement score between 450 and 559. Satisfactory completion of French 123 fulfills the portion of the language requirement.

Lec: T 9:05, 10:10, or 12:20; drills, M W F R 9:05, 10:10, 11:15, 12:20, 1:25, 2:30, or 3:35; S. A. Littauer. An all-skills course designed as the final course in the sequence. A review of grammar is included in addition to reading, writing, and conversation.

Note: Students placed in 200-level courses have the option of taking language and literature courses; see listings under "Literature" for descriptions of the literature courses, any of which may be taken concurrently with the 200, 203–204, or 211–212 language courses described below.

200 Intermediate Course: Language and Literature Fall or spring, 3 credits. Prerequisite: qualification in French with a CPT score no higher than 429. Offered by the Department of Romance Languages and Linguistics.

Fall: M W F 9:05 or 12:20 or TR 10:10–11:25. Staff.
M W F 11:15 or 12:20. S. Tarrow and staff.

Designed to provide an introduction to contemporary French culture and literature. Texts read and discussed are selected for their cultural and humanistic value. One-third of the class time is devoted to grammar review with emphasis on oral participation as well as improvement of language skills.

203 Intermediate Composition and Conversation Fall, spring, or summer 3 credits. Prerequisite: qualification in French.

Lec: T 11:15 or 1:25, W 2:30, or R 11:15; drills, M W F 8, 9:05, 10:10, 11:15, 12:20, 1:25, 2:30, or 3:35; I. Daly.

Emphasis on conversation. Weekly grammar review in addition to composition. Taught in French.

204 Intermediate Composition and Conversation Fall or spring, 3 credits. Enrollment limited. Prerequisite: French 203, permission of instructor; or placement by the Cornell Advanced Standing Examination (CASE) offered by the Department of Modern Languages and Linguistics.

Fall: T 10:10–11:25 or 12:20–1:40. Spring: T R 10:10–11:25 or 11:40–12:55; J. Béraud and staff. The course is based on audiovisual materials used in class: slides and recordings will accompany extensive discussions. A modest amount of reading each week will aim at improving students' active vocabulary.

211 Advanced French Fall. 4 credits. Limited to 15 students. Prerequisite: French 204 or 212 or Cornell Advanced Standing Examination (CASE). Offered by the Department of Romance Studies.

M W F 10:10, M W F 11:15, N. Furman, M W F 12:20, J. Béraud.

All-skills course. Detailed study of present-day syntax. Reading and discussion of texts of cultural relevance. Weekly papers.

312 Advanced French Spring. 4 credits. Limited to 15 students. Prerequisite: French 311 or placement by the Cornell Advanced Standing Examination (CASE). Offered by the Department of Romance Studies.


Continuation of work done in French 311. Less emphasis will be placed on study of grammar; more on the examination of text of an instructor of style and on oral presentation by students. Weekly papers.

[401] History of the French Language Fall. 4 credits. Prerequisites: qualification in French and Linguistics 101, or permission of instructor. Offered alternate years. Not offered 1987–88; next offered 1988–89.
M W F 1:30 J. S. Noblitt.

Diachronic development of French from Latin, with emphasis on phonological and morphological change. Course work includes problems in reconstruction, textual analysis, and discussions of theoretical topics, and external history.

M W F 10:10 J. S. Noblitt.

Designed to equip the student with the ability to apply linguistic descriptions in teaching French, with special emphasis on phonetics and morphology.

408 Linguistic Structure of French Fall. 4 credits. Prerequisite: qualification in French and Linguistics 101, or permission of instructor. Offered alternate years. Hours to be arranged. L. Waugh.

A descriptive analysis of modern French, with emphasis on its phonology, morphology, syntax, and semantics.

[410] Semantic Structure of French Fall or spring. 4 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 1987–88; next offered 1988–89.

Hours to be arranged. L. R. Waugh.

Introduction to French semantic elements—morphological, lexical and syntactic—from a functional perspective.


[602] Linguistic Structure of Old and Middle French Spring. 4 credits. Prerequisite: French 408 or permission of instructor. Offered alternate years. Not offered 1987–88.

Hours to be arranged. J. S. Noblitt.

Through the study of Old and Middle French texts, students analyze synchronically aspects of the grammar of the language at different periods.


Hours to be arranged. L. Waugh.

Selected readings of twentieth-century French linguistics.

630 French for Reading—Graduate Students Spring. 3 credits. Limited to graduate students. Hours to be arranged. Staff.

The primary aim of this course is to develop skill in reading French. (Those interested in an all-skills approach should consider French 121–122.) Some flexibility in selecting texts according to field of interest is offered. One hour per week is devoted to vocabulary building and preparation for standardized tests.

700 Seminar in French Linguistics Fall or spring, according to demand. Credit to be arranged. Hour to be arranged. Staff.

Seminars are offered according to faculty interest and student demand. Topics in recent years have included current theories in French phonology, current theories in French syntax, and semantics of French.

Literature

105 Freshman Writing Seminar: The French Novel Fall. 3 credits. M W F 11:15, R. Possen.

Evolution of the French novel from the seventeenth century to the present. Discussion of novels by such writers as Madame de Lafayette, Lacos, Stendhal, Flaubert, Maupassant, and Robbe-Grillet (readings in English translations).


108 Freshman Writing Seminar: Techniques of Interpretation: An Introduction to Semiotics (also Romance Studies 109) Fall or spring, 3 credits. M W F 9:05 or 1:25. Staff.

In its broadest meaning semiotics is the study of signs that carry information: road signs, fashion signs, advertisements, public signs, literary modes. This course, which does not presuppose prior technical knowledge, will introduce the student to the critical reading of signs: the signer (the concrete expression of the sign) and the signified (the message) and their various interactions. Exercises will be essays on how to analyze various signs taken from practical experience, such as advertisements from magazines or TV or from cultural phenomena (fashion codes, artistic modes).

201 Introduction to French Literature Fall, spring, or summer 3 credits. Prerequisite: qualification in French. French 201 serves as a prerequisite for all 300-level courses in French literature and is required of all majors. The course is divided into small sections. Some are taught entirely in French; the others will use English and as much French as the language proficiency of the students may allow. (For times of the all-French sections, see the supplemental course description available in Goldwin Smith 283.) Readings for all sections are the same and all in French. Papers may be written in French or in English.

Fall: M W F 9:05, staff; M W F 10:10, R. Possen; M W F 11:15, staff; M W F 12:20, staff; T R 8:40–9:55, D. Grossvogel; T R 10:10–11:25, R. Klein. Spring: M W F 9:05; staff, M W F 10:10, J. Béraud; M W F 11:15, staff; M W F 12:20; T R 11:40–12:55. Staff;

Stress is on the development of reading skills and, more generally, on cultural, sociological, and aesthetic implications of the texts. Reading will include works of nineteenth- and twentieth-century authors such as Baudelaire, Mallarmé, Flaubert, Sarrette, Camus, and Beckett.

202 Studies in French Literature Fall or spring, 3 credits. Prerequisite: French 201 or a CPT achievement score of 650 or more (students who have not taken French 201 should obtain consent of instructor; those with scores in the 560–649 range should see the description of French 201). Required of all majors, but not limited to them. A fee is charged for a number of short texts distributed by the instructor: Conducted in French.


Study of the classical literature of seventeenth-century France (Corneille, Racine, Molière, Madame de Lafayette) and its immediate forebears (Montaigne) and successors in the Enlightenment (Voltaire, Rousseau, Diderot, Beaumarchais). Special attention will be paid to the connections between classicism and humanitarian trends.

318 **Music and Poetry in France: Late Middle Ages and Renaissance (also French 618 and Music 373/673)** Spring. 4 credits. Prerequisite: permission of either instructor. This course will be of most interest to students who have done some work in music or in French literature. Reading music is not a prerequisite (recordings are available for major examples) but a reading knowledge of French is necessary. Graduate students who enroll in French (Music) 618 will be given supplementary assignments. (MWF 11:40–12:55: N. Furman. Facts and fiction, the question of realism seen through the novels of Gustave Flaubert. Readings will include Madame Bovary, L’Education sentimentale, Salammbo, Bouvard et Pécuchet, and Trois contes.


388 **The French Lyric Romance from Symbolism to Surrealism** Fall. 4 credits. Prerequisite: French 201 or permission of instructor. (TR 1:25–2:40: R. Klein. This course will trace the development of lyric poetry in France from Hugo and Baudelaire, the heirs of French romanticism, to the violent disruption of that tradition in surrealistic automatic writing. Particular attention will be paid to the sonnets and love poetry of authors including Rimbaud, Mallarmé, Verlaine, Villon, Valéry, Apollinaire, Breton, and Aime Cesaire.


333 **Contemporary French Thought** Spring. 4 credits. (TR 1:25–2:40: R. Klein. This course will offer an introduction to the thought of several of the major figures who are influential in contemporary French intellectual life. It aims to present a general survey of intellectual developments in France since the events of May 1968 by devoting particular attention to the work of Claude Lévi-Strauss, Roland Barthes, Jacques Derrida, Jacques Lacan, Michel Foucault, and Hélène Cixous. Students will be encouraged to do the reading in French, but English translations of all the principal works will be available.

334 **The Novel as Masterwork** Fall. 4 credits. Prerequisite: French 201 or permission of instructor. Conducted in French. (MWF 1:15: N. Furman. The second in a series of three courses that survey the French novel, this course traces the evolution of the genre in the nineteenth century. Major works of Stendhal, Balzac, Flaubert, and Zola will be emphasized.


354 **New Prose, Old Prose** Fall. 4 credits. Conducted in French. (TR 9:05–9:55: (individual conferences to be arranged): E. Morris. Readings in Rabelais and Montaigne (Gargantua, Tiers Livre, and about two dozen Essais) and in ancient authors they drew on: Plato, Plutarch, Seneca, Lucian, and the poet Virgil. Greek and Latin texts will be read in French translation. Critical (or skeptical) consideration of such concepts and issues as literary influence, posterny and legacy, ideals of prose style, history, and of an evolution in stage practice and dramatic theory. They will include, in addition to a selection of plays of Shakespeare and Molière, works by O'Neill, Pirandello, Genet, and Beckett. Class meetings will consist of both lectures and discussions.

429–430 **Hons Work in French** 429: Fall; 430: Spring. 4 credits each term, with permission of the adviser. Open to juniors and seniors. Consult the director of the honors program, A. Colby-Hall.

447–448 **Medieval Literature** 447: Fall; 448: Spring. 4 credits each term. Prerequisite: French 201 or permission of instructor. First term not prerequisite to the second. (MWF 9:05: A. Colby-Hall. French 447 deals with the epic and the theater. 448 with the romance and the lyric. Facility in reading Old French and appreciation of these four major genres are the primary goals of this course.


The point of departure is a critical reappraisal of the very concept of the Enlightenment. This implies both a "reading" of the eighteenth-century texts as well as of the modern theoretical and interpretive texts. It also requires a careful examination of the circulation and use of printed materials, the forms and contents of intellectual "sociability," new trends in education, the process of de-Christianization, the shifting character of French elites, and the connections between elite and popular culture.


462 **Racine (also French 662)** Spring. 4 credits. Conducted in French. 4 credits each term. Prerequisite: French 201 or permission of instructor. First term not prerequisite to the second. (MWF 9:05: A. Colby-Hall. Racine's plays will be read in chronological order; extracts from his other works will be considered occasionally, in relation to the theater. The principal emphasis will fall on four major tragedies—Andromaque, Britannicus, Iphigénie, and Phèdre—on which two full sessions will be accorded. Discussion will address diverse critical interpretations of the Racinian corpus and of these four plays; including phenomenological (Starobinski), psychoanalytic (Mauron and Dourovsky), semiotic (Pavel), structuralist (Barthes), sociological (Goldmann), theatrical (Scherer), and thematic (Hubert) perspectives.


For description see French 462.

469 Fiction and Film in France (also Comparative Literature 499) Fall. 4 credits.
The nature of selected dramatic structures and fictional forms (especially in realism and surrealism) and the influence on the motion pictures derived from them.

[596 Colette Not offered 1987–88.]


616 Music and Poetry in France: Late Middle Ages and Renaissance (also French 318 and Music 373/374) Spring. 4 credits.
Prerequisite permission of either instructor. This course will be of most interest to students who have done some work in music or in French literature. A good reading knowledge of French is a necessity.
For description see French 318.


650 Special Topics in French Literature 4 credits. Spring: 640, Spring, 4 credits each term.
Staff.
Guided independent study for graduate students.


648 Medieval Seminar: Le Roman de la Rose Spring. 4 credits.

567 Petrarchism and the Lyric Experience in France Spring. 4 credits. Conducted in French.
At least since the sixteenth century the forms and themes of French lyric poetry may be seen to reiterate the model of Petrarch's Canzoniere. This course will trace the fate of a characteristic Petrarchian experience, the epiphantic encounter with an idealized woman, and examine the way the conversion it effects has been variously lived and represented in the work of Maurice Scève and the School of Lyon, in the sonnets of the Pléiade, particularly Ronsard and Du Bellay, in French baroque poetry, and in romanticism. Baudelaire is taken to be a turning point, where the possibility of the lyric experience itself is challenged by the shock of a certain modernity and the emergence of an altered feminine persona. The course will conclude by examining echoes of Petrarchism in selected works of Mallarmé, Rimbaud, Valéry, and the surrealists. Theoretical texts on the nature of the lyric and on the concept of experience will be read in conjunction with the poetry.

[660 The Moralist Tradition (also French 460) 4 credits. Not offered 1987–88.]

662 Racine (also French 462) Spring. 4 credits.
For description see French 462.

[663 La Fontaine and Perrault: Fables, Tales, and Narrative Traps 4 credits. Not offered 1987–88.]


679 Comedy and Philosophy in the French Enlightenment Fall. 4 credits.
We will examine the close relation between philosophy and theater throughout the eighteenth century. Philosophers (Voltaire, Diderot, and even Rousseau) will write for the theater (and theatricality), while theater writers (Marivaux, Sedaine, and Beaumarchais) philosophize on stage. Such an alliance challenges the traditional opposition between the theological monologism of philosophical speech and the playful, even hysterical, dialogism of theatrical speech.


689 Bohemians and Dandies Spring. 4 credits.
Conducted in French.
T 2:30–4:25. N. Furrman.
The counterculture of the nineteenth century will be studied in the works of such writers as Bertrand, Gautier, Nerval, Villiers de l'Isle-Adam, Huysmans, Valéry, and Jarry.

[690 André Gide (also Comparative Literature 695) 4 credits. Not offered 1987–88.]


692 Sartre and Genet Spring. 4 credits.
The dramatic, philosophical, and social implications of these authors' works will be examined from the starting point of their convergence in Sartre's 'Saint-Genet'.


* Related Courses in Other Departments

Bilingualism and Bitextuality: The Case of North Africa (Society for Humanities 420)

German Studies


The German Major

Students majoring in German are encouraged to design their programs in a manner that will allow for diversity in their courses of study. It should enable them to become acquainted with a adequate selection of major works, authors, and movements of German literature and to develop their skill in literary analysis. Students majoring in German will normally proceed through German 201, 202, 203, 204. Students who, because of previous training, are qualified to enroll in 300- or 400-level courses will be permitted to do so. For details, students may consult their committee member or the Department of German Language. H. L. Kufner, in the Department of German Languages and Linguistics. Students majoring in German are expected to complete successfully a minimum of six 300- and 400-level courses in addition to German 303–304. These courses should be a representative selection of subjects in German literature, Germanic linguistics, or both. The attention of students majoring in German is called to the courses offered by departments and programs such as Comparative Literature, History, History of Art, Government, Music, Society for the Humanities, Theatre Arts, and Women's Studies, many of which supplement the course offerings in German.

Students majoring in German are expected to become competent in the German language. This competence is normally demonstrated by the successful completion of German 304. Placement of German majors who have done no work in German at Cornell will be determined by the level of preparation they have obtained elsewhere. For information, students should consult the major advisers, H. Deinert or H. L. Kufner.

Study Abroad

All German majors, particularly those who have had no German prior to coming to Cornell, are encouraged to spend at least part of their junior year abroad.

German Area Studies Major

The German area studies major is intended for students who are interested in subject matter related to German-speaking countries but not necessarily or not exclusively in German literature or linguistics. Students will select appropriate courses offered in literature, government, economics, music, theater arts, or other suitable subjects. These students will select a committee of two or more faculty members to help them design a program and supervise their progress. One committee member must be from the faculty of either the Department of Modern Languages and Linguistics or the Department of German Literature. The other member(s) should represent the student's main area of interest.

The German area studies major is expected to become competent in the German language. Such competence is normally demonstrated by successful completion of German 304. A minimum of six area courses above the 200 level is required for the major.

Students coming to Cornell with advanced standing in German and/or another subject often find it possible to complete two majors. Recent double majors have combined History and German, psychology and German, chemistry and German, and biology and German.

Honor.

The honors program in German is open to superior students who want to work independently in an area of their own choice. Students are free to select any faculty member of the Field of German Studies (in the case of area studies majors, the appropriate member of their committee) to assist them in designing their honors program, to supervise their work, and to help them select a suitable topic for an honors essay. The independent study courses, German 451 and 452, may form part of the program.

Freshman Writing Seminar Requirement

The following courses will satisfy the freshman writing seminar requirement. German 109, 151, 175, 211, and 312. For details students should consult the instructors.

Fees.

Depending on the course, a small fee may be charged for photocopy costs for course work.

Languages and Linguistics

121–122 Elementary Course
Spring or summer. 4 credits each term.
Pre-requisite for German 122: German 121 or equivalent. Intended for beginners or students placed by examination. Students who obtain a CPT score of 560 after German 121–122 attain qualification and may
enter the 200-level sequence; otherwise German 123 is required for qualification.

Lec, T 9:05, 11:15, or 1:25; drills, M W F R 9, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30. H. L. Kufner. A thorough grounding in all the language skills is given: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar, reading, and cultural information.

123 Continuing German Fall, spring, or summer. 4 credits. Limited to students who have previously studied German and have a CPT achievement score between 450 and 559. Satisfactory completion of German 123 fulfills the qualification portion of the language requirement.

Fall: Lec, M 2:30; drills, T–F 9:05, 10:10, 11:15, or 12:20. Spring: Lec, M 2:30; drill, T–F 10:10 or 12:20.

H. L. Kufner.

An all-skills course designed to prepare students for German 123 and have a CPT achievement score in reading, and cultural information.

Practice is in small groups. Lectures cover grammar, conversation.

Prerequisite: German 304 or equivalent. Not offered Fall, spring, or summer. 4 credits. Emphasis is on increasing the student's oral and written ability to apply current linguistic theory to the second-language learning situation.


M W F 9:05. H. L. Kufner. Designed to equip the student of German with the ability to apply current linguistic theory to the second-language learning situation.

108 Linguistic Structure of German Spring. 4 credits. Prerequisites: German 204 and Linguistics 101–102, or permission of instructor. Not offered 1987–88.

Hours to be arranged. H. L. Kufner. A more analytic approach of present-day German, with emphasis on phonology and syntax.

602 Gothic Spring. 4 credits. Prerequisite: Linguistics 101. Hours to be arranged. W. E. Harbert. Linguistic structure of Gothic, with extensive readings of Gothic texts.

603 Old High German, Old Low Franconian Fall. 4 credits. Prerequisite: Linguistics 102. Offered alternate years. Not offered 1987–88.

Hours to be arranged. Staff.


Hours to be arranged. Staff.

605 Structure of Old English Fall. 4 credits. Prerequisite: German 401. Hours to be arranged. W. E. Harbert. Linguistic overview of Old English, with emphasis on phonology and syntax.

606 Topics in Historical Germanic Phonology Fall. 4 credits. Prerequisite: German 401. Not offered 1987–88. Hours to be arranged. J. Jasanoff. The Germanic verbal system and its Indo-European origins.

607 Topics in Historical Germanic Morphology Fall. 4 credits. Prerequisite: German 401. Not offered 1987–88. Hours to be arranged. J. Jasanoff. The Germanic verbal system and its Indo-European origins.

608 Topics in Historical Germanic Syntax Fall. 4 credits. Prerequisite: German 401. Not offered 1987–88. Hours to be arranged. W. E. Harbert. A diachronic and comparative investigation of syntactic processes in the older Germanic languages.

609–610 Old Norse 609. Fall; 610. Spring. 4 credits each term.

Hours to be arranged. Staff. Study of the linguistic structure of Old Norse, with extensive reading of Old Norse texts.

611 Readings in Old High German and Old Saxon Spring. 4 credits. Not offered 1987–88. Hours to be arranged. J. Jasanoff.

Texts are chosen to suit the interests of the students taking the course but normally include selections from the more extensive Old High German and Old Saxon sources (Otfrid, Italien, Holland) as well as representative shorter works such as Hildebrandtsid, Muspilf, and Genesis.

612 Germanic Tribal History Spring. 4 credits. Prerequisite: German 401. Not offered 1987–88. Hours to be arranged. Staff.

The history of the Germanic tribes from about 500 B.C. to A.D. 500; introduces the study of Proto-Germanic and the separation of the Germanic languages.

631–632 Elementary Reading I 631. Fall; or summer. 632. Spring or summer. 3 credits each term. Limited to graduate students. Prerequisite for German 632: German 631 or equivalent.

M W F 9:05 or 3:35. D. McCraw. Emphasis is on developing skill in reading, although some attention will be devoted to the spoken language, especially to listening comprehension.

710 Seminar in German Linguistics Fall or spring, subject to the needs of students and to the limitations of staff time. 4 credits.

Hours to be arranged. Staff.

720 Seminar in Comparative Germanic Linguistics Fall or spring, subject to the needs of students and to the limitations of staff time. 4 credits. Not offered 1987–88.

Hours to be arranged. Staff. Selected topics including the history, structure, and dialects of German.

740 Seminar in Dutch Linguistics Fall, subject to the needs of students and to the limitations of staff time. 4 credits.

Hours to be arranged. F. van Coetsen. Selected topics including the history, structure, and dialects of modern Dutch.

Literature

Freshman Writing Seminars

109 Folk Tales and Folk Poetry Fall and spring. 3 credits each term.

M W F 9:05, 10:10, 11:15, or 12:20, or TR 8:40–9:55.

I. Ezergezis and staff. Discussion and analysis of various types of folk literature from primitive legends, myths, and ballads to contemporary literary tales. Aims to develop reading skills that can be redirected to the student's own expository writings. Readings (in English translation) range from Grimm's Fairy Tales to stories by J. R. R. Tolkien.

151 Kafka, Hesse, Brecht, and Mann Fall and spring. 3 credits each term.

M W F 9:05, 10:10, 11:15, or 12:20, or TR 11:40–12:30.

H. Deinert and staff. This course will be based on complete works (in English translation) by four representative German authors of the first half of the century. Although dealing with works of great popular appeal (Demian, Siddhartha, Death in Venice, The Metamorphosis, Mother Courage, Galileo, and others), the emphasis of the course will be on improving writing skills. We will meet once a week for a combined lecture. In addition, there will be regular conferences between students and their instructors to discuss the papers.

175 German Cinema Fall and spring. 3 credits each term.

T R 10:10–11:25 or 11:40–12:55. G. Waite and staff. How do you look at movies? How do you look at German movies? How do you talk and write about what you see? This freshman writing seminar has three primary and interrelated aims: (1) to provide students with the tools necessary to view all movies analytically and critically; (2) to sharpen students' abilities to articulate their ideas, in this case their ideas about what they see; and (3) to introduce students to the history (from the earliest silent flicks, through the Nazi period, up to the present scene) of one of the most exciting and influential cultural practices: German cinema. No knowledge of German is required: all films will have subtitles or be dubbed, or translated scripts will be provided. You will write many short papers that will be returned with great attention to analytic and writing skills. Lectures, classroom discussions, and screenings.
Courses Offered in German

201 Introduction to German Literature I Fall and spring, 3 credits each term. Prerequisite: qualification in German or permission of instructor. Taught in German. Fullfills both the language proficiency requirement and, followed by German 202, the humanities distribution requirement.

202 Introduction to German Literature II Fall and spring, 3 credits each term. Prerequisite: German 201 or permission of instructor. Taught in German.

211 Intensive Workshop in Germanic Studies for Freshmen I Fall. 6 credits. Intended for entering freshmen with extensive training in the German language (CPT achievement score of 650 or comparable evidence; please consult instructor). Taught in German. Satisfies the language and distribution requirements or the freshman writing seminar requirement.

230 Modern Germany Fall. 4 credits. Prerequisite: German 202 or equivalent. Taught in German.
Introduction to the history of postwar Germany, the development of the two Germanies, and their societies. The emphasis is on cultural and social institutions such as mass media, educational systems, and political parties. Students will have the opportunity to practice their spoken and written German.

Everyone knows what health and disease are. Do they? This Common Learning course on health and disease will explore some of the cultural, psychological, philosophical, anthropological, medical, economic, and political dimensions of these concepts to show how various models of disease function in contexts from business to engineering. From the medical profession. The course will be divided into two segments: the first will examine the general implications of concepts of health and illness; the second will study these general principles as reflected in the definitions, treatment, and mythmaking surrounding one specific disease: schizophrenia. The course will draw on specialists from throughout the University.

348 Women in Medieval Literature (also Comparative Literatures 349 and Women's Studies 349) Spring. 4 credits. MWF 10:00. B. Buechner.
A study of women and their roles in the social order as portrayed in the literature of the Middle Ages. Readings will illustrate the range of attitudes toward women from asceticism and antifeminism to their idealization in 170 Arts and Sciences

357 Major Works of Goethe Spring. 4 credits. Prerequisite: German 201—202 or permission of instructor. Taught in German.
Goetz, Tasso, Iphigenie, Werther, Wahlverwandtschaften, Novelle, selections from critical writings, and poetry.

358 Romanticism Fall. 4 credits. Prerequisite: German 201—202 or permission of instructor. Taught in German. Not offered 1987—88.
MWF 10:00. G. Waite.
A systematic survey of texts of early German romanticism. We will focus primarily on a close reading of exemplary works but do so always with attention to the larger ideological, historical, and social contexts from which European literature of the late eighteenth and early nineteenth centuries emerged.

359 Heine and Büchner Spring. 4 credits. Prerequisite: German 201—202 or permission of instructor. Taught in German. Not offered 1987—88.
This course will introduce major themes and problems of early to mid-nineteenth century German literature by way of a close, in-depth analysis of these two exemplary writers. We will also discuss different modes of response by literature to the most pressing political and social issues of its day.

360 Naturalism and Feminism Not offered 1987—88.

362 Modern German Literature II: Twentieth-Century Prose Not offered 1987—88.

363 Contemporary Literature Not offered 1987—88.

364 German Lyric Poetry of the Nineteenth Century Fall. 4 credits. Prerequisite: German 201—202 or permission of instructor. Taught in German.
This course will cover the period from the mid-1790s to the mid-1890s and interpret major texts from the mature Goethe to the young Hofmannsthal. Readings and discussions will illuminate the development of individual poets in their time, the transformation of poetic speech, and the history of forms. Questions of poetics, forms, reception, canons, and influence, the problem of poetic identification, and the role of poetry and the poet in society will complement the analyses. In the context of the romantic identification of music and poetry we will hear musical settings of representative poetic texts (Lieder by Muller/Schubert, Heine/Schumann, Morike/ Wolf, and Ruckert/Mahler).

365 German Poetry of the Twentieth Century Spring. 4 credits. Prerequisite: German 201—202 or permission of instructor. Not offered 1987—88.
The seminar will focus on close readings of selected exemplary texts. George, Hofmannsthal, and especially Rilke will provide the foundations upon which aspects of tradition, modernism, avant-gardism, and hermeticism can be defined and differentiated. Expressionism, dada, surrealism, traditional and recent nature poetry, political poetry from the right and left, Holocaust poetry, and the hermetic Klee and concrete poetry are the areas of primary interest.

374 Opera Fall. 4 credits. Prerequisite: good reading knowledge of German.
The same as Music 274, but with occasional meetings devoted to discussion of individual texts. (See also Music 374.)

376 Contemporary Soviet Latvian Literature Fall. 4 credits. Prerequisite: permission of instructor. Taught in Latvian. Not offered 1985—86.
Analysis of the verse and prose of such world-cla? cifier Soviet authors as Vaciets, Belsieva, Ziedonis, Peters, and Ezera. We will also examine the social and political climate surrounding their work by reading current newspapers as well as literary and theoretical periodicals.

Courses in English Translation

283 Contemporary European Society and Politics (also History 283 and Government 343) Fall. 4 credits.
T R 2:30—3:45. J. Weiss.
An introduction to European societies, their development, and current dynamics. The course is designed for students with an interest in, or experience of, various European countries, who wish to increase their knowledge of Western Europe. There are no formal prerequisites.

285 Contemporary European Society and Politics (also History 285 and Government 285) Fall.

An intensive reading of selections from Nietzsche's poetry, letters, and philosophical writings. "The Birth of Tragedy, The Gay Science, Thus Speake Zarathustra, Beyond Good and Evil, Ecce Homo." His work will be read in the intellectual context of his time and will be interpreted both as a reflection of his intellectual development and as a manifestation of his literary genius. In discussing the literary aspect of his work, close attention will be paid to Nietzsche's poetic texts.

320 Postwar German Novel Spring. 4 credits.
A reading, in English translation, of such post-1945 German novelists as Grass, Boll, Johnson, and Christa Wolf. This course is recommended for the concentration in modern European studies.
courtly love lyric and romance. We will examine woman’s putative influence in literature, both positive and negative, and on man and society, and the debates over woman’s “proper” attitude and role. Works in English translation will include a play by Hrotsvit of Gandersheim, the Nibelungenlied, Wilhelm, selected Mariological and mystical poems, courtly love lyric, Parzival, and Tristan and Isolde.

[349] Anti-Semitism in Germany and the Jewish Response (also Near Eastern Studies 349) Spring. 4 credits. Reading knowledge of German helpful, though the basic texts will be read in English. Not offered 1987–88.

TR 2:55–4:10. S. L. Gilman. An overview of the history of German anti-Semitism from Luther to Hitler. Readings from political, theological, and literary texts ranging from Martin Luther’s Father’s (as background to a reading of Luther) to the anti-Semitic literary novels of the nineteenth century to Mein Kampf. Parallel texts will be examined to judge the Jewish intellectual and literary response to evolving forms of German anti-Semitism.


396 German Film (also Comparative Literature 396 and Theatre Arts 396) Fall. 4 credits. Requirements: participation in class discussion, one paper, midterm, and final.

TR 11:40–12:55; screening, T 4:30 D. Batrinch. The goal of the course is to explore the form and context of German film in relation to the cultural and socioeconomic context of which it is a part. Accordingly, the material discussed will be divided into three major periods: Weimar film, 1918–1933, Nazi film 1933–1945, and postwar film, 1945–present. Readings and lectures will be devoted to formal and cultural developments in the history of German film as well as interpretive analysis of selected individual films. In both lectures and discussions, particular emphasis will be placed on helping students develop an appropriate method for viewing and analyzing films.

[399] Forms of Opposition: German Women Writers on the Nazi Period (also Comparative Literature 399 and Women’s Studies 399) Not offered 1987–88.

419 Thomas and Heinrich Mann Fall. 4 credits.

MW F 2:00–3:19. I. Ezerigal. We will read, in translation, a group of texts by Thomas and Heinrich Mann (including Buddenbrooks, Doctor Faustus, Henri VII) and consider them as autonomous works and as witnesses to the dynamic of a brothers’ strife that illuminates not only a model of psychological tensions but highly significant cultural and political configurations of a decisive time in German history. This is indeed “a brotherhood in which German history was mirrored . . . in all its agony.” Essayistic and publicistic texts of both brothers will also be analyzed along with some of their correspondence. We will also read some background material to provide insight into the needed social, political, and intellectual context. This course is recommended for the concentration in modern European studies.

[497] Heidegger: Short Writings (also Comparative Literature 497 and Romance Studies 497) Fall. 3 credits. Open to upper-division undergraduates and graduate students. Not offered 1987–88.

R 2:30–4:25. C. M. Arroyo. A study of Heidegger’s essays on language, poetry, science, and technology. Readings include “The Origin of the Work of Art,” “What are Poets for?,” “The Age of the World Picture,” “The Question Concerning Technology,” “Letter on Humanism,” and other writings on language and human existence. Aesthetic and literary ideas will be tested through the analysis of literary texts. The course will explore the possibilities and meaning of interdisciplinary knowledge on the basis of a “step back” (Schrift zurück) to topics that are predisciplinary.

Graduate and Advanced Undergraduate Courses


M W F 9:05. B. Buettner. The course will emphasize learning Middle High German in a literary context, using the Nibelungenlied and a romance of Hartmann von Aue.

406 Introduction to Medieval German Literature II Fall. 4 credits. Prerequisite: German 405 or equivalent.

M W F 9:05. A. Groos. The course will survey the classical period, emphasizing Wolfram von Eschenbach’s Parzival, Gottfried von Strassburg’s Tristan und Isolde, and major poets of the Minnesang, especially Walther von der Vogelweide.


[438] German Drama after 1945 Fall. 4 credits. Prerequisite: permission of instructor. Taught in German. Not offered 1987–88.

M W F 11:15. I. Ezerigal. Reading of selected plays post-World War II German-language playwrights from East and West such as Durrenmatt, Frisch, Handke, Weiss, Heiner Muller, and Peter Hacks.

451–452 Independent Study 451, fall; 452, spring. 1–4 credits each term. Prerequisite: permission of instructor. Hours to be arranged. Staff.


R 1:25–3:20. P. U. Hohendahl. This course is designed as an introduction to the history of the Frankfurt school and the essential concepts of critical theory. The emphasis will be placed on the theory of culture and its application to the understanding of literature and aesthetics. The reading material will be taken from the works of Max Horkheimer, Theodor W. Adorno, Walter Benjamin, and Jürgen Habermas.

Seminars

Note: For complete descriptions of courses numbered 600 or above consult the appropriate instructor.

[605] Introduction to Modern German Literary Theory with an Emphasis on Contemporary Criticism (also Comparative Literature 605) Spring. 4 credits. Not offered 1987–88.

R 2:30–4:25. P. U. Hohendahl. The seminar will offer a survey of German criticism from 1900 to the present. Emphasis will be placed on the period from 1945 to the present. The aim of the course is to familiarize incoming graduate students with the main currents of German criticism. Readings will be taken from Heidegger, Stiger, Kate Hamburger, Szonoli, Adorno, Jauss, and others.


[624] Seminar in Medieval German Literature II Spring. 4 credits.


M 1:25–3:25. S. L. Gilman. Topic for 1987: disease and society in fifteenth- and sixteenth-century Germany. The course will center on the function of metaphors of disease in writers such as Erasrus, Luther, and Hrutten and the relationship between these metaphors and the social perception of illness, especially the syphilis epidemics of the late fifteenth and early sixteenth centuries. Readings in German and Latin of major texts in intellectual and medical history.


W 1:25–3:20. G. Waite. An intensive analysis of parts I and II. Our task will be to combine techniques of close reading and attention to textual nuance with a concern for the history of the reception and appropriation of the text, including contemporary theory (e.g. hermeneutics, deconstruction, semiotics, feminism, and historical materialism).

633 German Romanticism Fall. 4 credits.

W 1:25–3:20. G. Waite. Structured introduction to German literature, philosophy, criticism, and painting from 1789 to 1830 in the context of European developments (Lovejoy, Wellek, Benjamin, de Man, Wimsatt, Hartmann, Klaus Peter). The larger social context. Prerequisites: Blackbourn, Eley) requires readdressing aesthetic and poetic questions of a romantic “school” (Heine), a “German ideology” (Marx and Engels), a “romantic ideology” (McGann), “art and the Industrial Revolution” (Klingender), and “the flight from reality of the artistic period” (Lukacs). Crucial and related issues of gender and political economy, including the trope of the automaton (Manfred Frank). Understanding critically the reception of this ostensible object by subsequent history. What is the ulterior motive behind literary periodization and (literary) history? Most readings are in German. Discussion and papers are in English. Students from other disciplines are welcome.


639 German Poetry of the Twentieth Century
Spring. 4 credits.
R 3:35. L. M. Olschner.
The seminar will focus on close readings of exemplary poetic and theoretical texts. George, Hofmannsthal, and especially Riike will provide the foundation upon which aspects of modernism, avant-gardism, and hermeticism can be defined and differentiated. Expressionism, dada, surrealism, traditional and recent nature poetry, political poetry from the right and left, Holocaust poetry, poetry of Innerlichkeit, and concrete poetry are the areas of primary interest.

[641 The Modern German Novel Not offered 1986–87]

642 West German Literature, 1945–1970
Spring. 4 credits. Open to advanced undergraduates with permission of instructor. Taught in German. Not offered 1987–88.
The seminar will emphasize source texts of all genres and analyze the cultural and political background leading to the production of texts that may be read as mimetic echoes or critical reactions to the emergence of postwar West Germany. The twenty-year history of the Gruppe 47 will provide the central frame of reference. The dubiousness or validity of terms such as Nullpunkt, Kahlischlag, and Trümmerliteratur; the function, significance, and history of literary magazines in the late 1940s and early 1950s; and presuppositions of literary critics; the problem of Vergangenheitsbewältigung; and the role of literature in the public sphere are background areas that will add to an understanding of primary texts. Within this context the positions of Benn and E. Jünger will be examined, and paradigmatic texts by Böll, Grass, Johnson, Weiss, Enzensberger, and others will be interpreted in close readings.

643 East German Novel of the Seventies and Eighties
Fall. 4 credits.
T 3:35. D. Bathrick.
The course will explore the thematic and formal developments of the novel in the DDR since the publication of Christa Wolf’s Nachdenken über Christa T. (1968) in the light of radically changing cultural and political norms (women, dissent, Jewish question, and hermeticism) and the role of literature in the society as a whole.

[660 Visual Ideology
Some of the most interesting and influential approaches to understanding objects of art come from the peripheries of traditional art history and criticism. This seminar will analyze some of these approaches so as to understand the interactions between the disciplines of art history and criticism and such fields as philosophy, psychoanalysis, film, literary theory, and sociology. More specifically, we will attempt to advance a dialectical interpretation of the ideological and sociopolitical determinations on the reciprocal production and consumption of visual artifacts. Readings taken from Althusser, Barthes, John Berger, Benjamin, Briony, T. J. Clark, Freud, Gadamer, Carlo Ginzburg, Hadjimichael, Hauser, Klinger, Kristeva, Lacsamana, Lenin, McCabe, Marin, Marx, Nietzsche, Ortega, Plekanich, Max Raphael, Sontag, and Wolin. Examples of artifacts for analysis will be drawn primarily from the history of oil painting, but we will discuss other approaches to art history, including history, music, criticism, philosophy, and literature. Authors to be considered are Heine, Wagner, Nietzsche, and Thomas and Heinrich Mann.

665 The Search for German Cultural Identity, 1850–1920
Spring. 4 credits.
T 3:35. P. U. Hinnenkamp.
The seminar will concentrate on the period between the Revolution of 1848 and World War I, emphasizing the discourse on German national identity. The texts will be drawn from various areas, including history, music, criticism, philosophy, and literature. Authors to be considered are Heine, Wagner, Nietzsche, and Thomas and Heinrich Mann.

676 New German Cinema (also Theatre Arts 676)
Spring. 4 credits.
T 11:40–12:55; screening, T 4:30. D. Bathrick. The course will examine in depth major films and filmmakers who are considered a part of the German new wave cinema (Rasmbung, Schröndorf, Von Trotta, K lapse, Sander, Herzog, Wenders, etc.). Of special interest will be the differing impact of these films in the contexts of West Germany, Europe, and the United States.

678 Theory and Practice of Modern Drama (also Theatre Arts 678)
Spring. 4 credits.
The course will examine different theories of modern drama (Sondhi, Brecht, Artaud, etc.) and discuss these on the basis of a number of representative works of modern drama. The point will be to trace the interrelation between theory formation and dramatic practice.

[679 Bertolt Brecht in Context (also Comparative Literature 679 and Theatre Arts 679)
Spring. 4 credits. Requirements: seminar paper that will form the basis for an oral presentation for class discussion. Not offered 1987–88.
Brecht’s theory and dramatic praxis will be examined in the light of a two-fold context: (1) the relation of selected plays and writings to the historical contingencies of the Weimar and exile periods in which they emerged; (2) in later periods — an analysis of the reception and various readings of these same works by later writers and critical publics in West Germany, East Germany, and the United States as a way of understanding the changing nature of aesthetic values in the postwar period. Special attention will be given to the importance of Marxism for Brecht’s art, as well as to the author’s role as a representative of the cultural avant-garde.

[682 Seminar on Richard Wagner (also Music 678)
Spring. 4 credits.
Not offered 1987–88.]

683 Freud and the Fin de Siècle
Fall. 4 credits. Reading knowledge of German necessary.
A survey of major late nineteenth and early twentieth century works reflecting the adoption of the biological model as a central metaphor in German thought. Central to the course will be Freud’s early work (Studies in Hysteria, Interpretation of Dreams, Three Essays). Other writers to be read include Nietzsche, Heaehel, Andreas-Salomé, Wedekind, Hauptmann, Schnitzler, and Lombroso.

[684 Heidegger: A Reading of Being and Time Not offered 1987–88.]

685 Gramsci and Cultural Politics (also Comparative Literature 685 and Government 685)
Spring. 4 credits.
The modern transnational-capitalist state rules not only by domination and coercion but by the “noncoercive coercion” of cultural hegemony. What is the proper role of intellectuals (and who and what is an intellectual?) in cultural politics? How do “leftist” cultural critics, theorists, and artists living under late capitalism relate as individuals to the collective struggles of social minorities? What is the relationship of intellectuals to political parties? We will deal with the political and cultural writings of Antonio Gramsci—whether Gramsci is best understood as a “Western Marxist” or as an extension of Leninist “orthodoxy”—and with the response of critics, artists, and cultural practices to Gramsci’s challenge: the noir film La Terra trema, Griffin’s death mask, collectively to the writings of Brecht, and the sociological work of Steven Rose, the political work of Rafael Angel and Brian Moore, and the political theory and practice of “low-intensity conflict” as developed by the CIA and the NSC, and the cultural theories of Williams (Marxism and Literature) and Said (The World, the Text, and the Critic).

[688 Art and Truth: The Aesthetic Theory of Walter W. Adorno (also Comparative Literature 689)
The seminar will focus on the aesthetic writings of Adorno, beginning with relevant chapters from his Dialektik der Wissenschaft, as well as on selected essays on European literature and music. The emphasis then will be placed on Adorno’s major posthumous work, Aesthetic Theory (1970). The aim is a close reading of Adorno’s theory in the context of the Kanitian and Hegelian tradition.

[689 German Feminist Criticism and Theory (also Women’s Studies 690)
Spring. 4 credits. Open to qualified undergraduates with permission of instructor. Reading knowledge of German recommended but not required. Not offered 1987–88.
This course is designed to explore developments in feminist literary theory with particular attention to the field of German literature. We will consider competing critical strategies and their political implications by working through different readings of specific literary texts and by raising questions about the implications for feminism of competing critical strategies in the general field of literary theory; the relations between feminism and established critical schools; the tension in feminist Germanistik between critical attention to the “male canon” and the construction of a female literary tradition; the impact on West and East German feminism(s) of Hightower’s, as well as on selected texts and American work: the impact and treatment of the Nazi period; the effects of the East-West divide on development in both Germanies; the impact on feminist literature and criticism of Third World women in Germany; and approaches in West and East Germany to imperialism and racism.

[698 Gadamer’s Hermeneutics (also Comparative Literature 698)
Fall. 4 credits. Open to qualified undergraduates with permission of instructor. Not offered 1987–88.
An intensive and systematic study of H. G. Gadamer’s work Truth and Method (in translation) will lead to an examination of such problems as the structure of humanistic and historical knowledge and its relation to theoretical knowledge, “objectivity” and “subjectivity” in interpretation, the role of language in human existence, and the nature of the aesthetic phenomenon. Various intellectual trends will be located and evaluated in terms of an overall theory of understanding.

[699 The Hermeneutic Tradition (also Comparative Literature 699)
Not offered 1987–88.]

753–754 Tutorial in German Literature
Fall and spring. 1–4 credits per term. Prerequisite: permission of instructor. Hours to be arranged. Staff

Related Courses in Other Departments

Government 376 Marx
Government 388 War and Society: Origins of World War I, 1870–1919 (also History 379)
History 357 Survey of German History, 1648–1890
History 358 Survey of German History, 1890–Present
Society for the Humanities 419 Science, Race, Racism: The Response and Resistance to Scientific Racism, 1800–1930
Modern Greek
See listings under Classics.
Modern Hebrew
See listings under Near Eastern Studies.
Hindi-Urdu

101–102 Hindi-Urdu Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Hindi 102: Hindi 101 or equivalent.

A semi-intensive course for beginners. A thorough grounding in all the language skills is given: listening, speaking, reading, and writing.

201–202 Hindi Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Hindi 201, qualification in Hindi; for Hindi 202, Hindi 201 or permission of instructor.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Hindi 203, qualification in Hindi; for Hindi 204, Hindi 203 or permission of instructor. Hours to be arranged. G. Kelley.

301–302 Readings in Hindi Literature 301, fall; 302, spring. 4 credits each term. Prerequisites: for Hindi 301, Hindi 202; for Hindi 302, Hindi 301 or equivalent. Hours to be arranged. G. Kelley.

303–304 Advanced Composition and Conversation 303, fall; 304, spring. 4 credits each term. Prerequisites: for Hindi 303, Hindi 204 or equivalent; for Hindi 304, Hindi 303 or equivalent. Hours to be arranged. G. Kelley.

305–306 Directed Individual Study 305, fall; 306, spring. 2–4 credits each term. Prerequisite: for Hindi 203, 303–304 or equivalent knowledge of Hindi or Malay. Hours to be arranged. J. U. Wolff.

401–402 Advanced Readings in Hindi and Malay Literature 401, fall; 402, spring. 4 credits each term. Prerequisites: for Hindi 401, Indonesian 203 or equivalent; for Indonesian 402, Indonesian 401 or equivalent. Hours to be arranged. J. U. Wolff.

Related Course

Malayo-Polynesian Linguistics (Linguistics 655–656)

Italian

G. Chierchia, A. Grossvogel, (director of the Italian Language, and 403, Linguistic Structure of Italian, may be counted toward the 24 credits required for the major (an introductory linguistics course is a prerequisite of Italian 402 and 403). Students majoring in Italian will also be expected to acquire competence in the handling of the language. That competence may be demonstrated by passing an oral and written examination to be arranged with the adviser.

Italian majors may study in Italy, generally during their junior year, under any one of those study-abroad plans organized by American universities that allow the transfer of grades and credit, such as the Syracuse semester in Florence, Italy.

Fees. Depending on the course, a small fee may be charged for copies of texts for course work.

Language and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Prerequisite for Italian 122: Italian 121 or equivalent. Intended for beginners or students placed by examination. Students who obtain a CPT score of 560 after Italian 121–122 attain qualification and may enter the 200-level sequence; otherwise Italian 123 is required for qualification.

Lec, T 10:10, 12:20; or 2:30; drills, M W F R F 9,05, 10,10; 11:15; 12,20, 1, 2, 2, 5, 23, 0, 3.35, Fall: M. Swenson; spring: I. Chierchia.

A thorough grounding is given in the language skills—listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar and cultural information.

123 Continuing Italian Fall. 4 credits. Limited to students who have previously studied Italian and have a CPT achievement score between 450 and 559.

Satisfactory completion of Italian 123 fulfills the qualification portion of the language requirement.

Modern Languages, Literatures, and Linguistics

173
Survey of Italian grammar in the light of current linguistic theories. Selected topics in syntax (including, e.g., null subjects, impersonal structures, causatives, unaccusative constructions, clitics) and, on the basis of the interest of participants, in phonology (including, e.g., syllable structure, stress, raddoppiamento phenomena). Comparisons with other Romance languages.

[432] Italian Dialectology Spring, according to demand. 4 credits. Not offered 1987–88.
Hours to be arranged. C. Rosen.

631 Readings in Italian Opera Libretti Spring. 2 credits. For graduate students only. Prerequisite: permission of instructor.
Hours to be arranged. C. Rosen.

Several Metastasio libretti and two or three libretti from later periods are read with the aim of understanding the syntax, literal meaning, and immediate metaphorical meanings. Some discussion of metrics.

Hours to be arranged. C. Rosen.

Literature

201 Introduction to Medieval and Renaissance Literature Fall. 3 credits. Prerequisite: reading knowledge of Italian.
M W F 12:30. A. Grossvogel and staff.
The course will focus on the major figures and texts of medieval and Renaissance literature with an eye on the wider cultural context of Italy. We will begin with readings and discussions of the poems of the Sweet New Style (Guinizzelli, Cavalcanti, and Dante) and selections from Petrarch's Canzoniere and Boccaccio's Decameron. Finally we will look at some poems of Michelangelo, one canto from Ariosto's Orlando Furioso, and Machiavelli's The Prince.


334 Dante's Divine Comedy (also Comparative Literature 344) Spring. 4 credits.
Intensive study of Dante's poem in relation to the culture and history of medieval Europe. Major topics: Theology and poetics in the Comedy; Dante and the natural sciences, Dante's Christianization of Classical epic, and the Comedy and Dante's minor works.


[370] Eighteenth-Century Thought Spring. 4 credits.
The readings for this course will focus on the dramatic works of Goldoni and Alfieri, the two major Italian playwrights of the eighteenth century. Carlo Gozzi's fiabe, Metastasio's melodrama, Chiarani's parodies, and the last sparks of the commedia dell'arte will also be examined to illustrate the pervasive character of the dramatic expression in the Italian literary and artistic life of the time. Attention will be given to Goldoni's role in the reform of the theater and to the bitter controversy he had to face.

390 Literature to Cinema (also Comparative Literature 382) Fall. 4 credits.
T R 7:30–9:30. A. Grossvogel.
A study of the way literary language has influenced Italian cinema. The films to be screened will be by Antonioni, Bertolucci, Bolognini, De Sica, Fellini, Pasolini, Rossellini, Scala, Taviani, Visconti, Zeffirelli, and Zurlini. The works to be read in conjunction with these films will include selections from Boccaccio's Decameron and from the narrative works of Verga, Pogazzaro, D'Annunzio, Pirandello, and others.


395 Readings in Contemporary Italian Fiction Spring. 4 credits. Taught in English.
Beginning with Svevo's La coscienza di Zeno and ending with Eco's Il nome della rosa, we will read novels and short stories of the most significant contemporary Italian authors, such as Buzzati, Calvino, Gadda, Landolfi, Moravia, Pasolini, Sciascia, and Sgorlon. Most of the works to be read have been translated.

399 Cinema to Literature Spring. 4 credits. Taught in English.
T R 2:30–4:25 p.m. A. Grossvogel.
The course will consist of a comparative study of selected films by Fellini, Antonioni, Visconti, and others and of works by major contemporary writers such as Montale, Ungaretti, Gadda, and Calvino. These authors' similarities and contrasts are selected to illustrate the evolution of contemporary aesthetics in cinematography and poetry in Italy.

419–420 Special Topics in Italian Literature 419, Fall; 420, spring. 2–4 credits each term. Prerequisite: permission of instructor.
Staff.
Guided independent study of specific topics.

429–430 Honors in Italian Literature 429, fall; 430, spring. 4 credits each term. Limited to seniors. Prerequisite: permission of instructor.
Staff.


458 Tasso Fall. 4 credits.
Questions about literature and authority will be central to our study of the works of Torquato Tasso, a major poet of the Italian sixteenth century. Particular attention will be devoted to the possibilities that psychoanalytic and feminist criticism offer for an alternate reading of Tasso. The focus of the course will be the romantic epic Gerusalemme Liberata (1581) and Tasso's revised version of this poem, the Gerusalemme Conquistata (1593). Other readings will include the pastoral dramas Arnita and selections from Tasso's theoretical writings, lyric poetry, dialogues, letters, and religious poetry.


639–640 Special Topics in Italian Literature 639, Fall; 640, spring. 4 credits each term. Staff.


Japanese

Language and Linguistics

101–102 Elementary Course 101, Fall; 102, Spring. 6 credits each term. Prerequisite for Japanese 102: Japanese 101 or placement by the instructor during registration. Intended for beginners or for those who have been placed in the course by examination.
Lecs, M W F 10:10; drills, M–F 9:05, 11:15, 12:20, 1:25, or 2:30. Staff.
A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

123 Accelerated Introductory Japanese Fall. 6 credits. Prerequisite: placement by the instructor during registration.
Accelerated training in listening, speaking, reading, and writing for students who have already acquired a limited facility in Japanese through residence in Japan or brief formal study but who require additional training to qualify for admission to Japanese 102.

[141–142] Introductory Japanese for Business Purposes 141, Fall; 142, Spring. 4 credits each term. Prerequisite for Japanese 142: Japanese 141 or placement by the instructor during registration. (For undergraduates only. Graduates, see Japanese 541–542.) Not offered 1987–88.
Lecs, T R 1:25, secs, M W F 9:05 or 1:25. Staff.
Introductory Japanese for students interested in international business and economics.)
201–202 Intermediate Japanese Reading I 201, fall; 202, spring. 2 or 3 credits each term. Students having had Japanese 203 and 204 register for 2 credits and attend the W drill and the F lecture; other students register for 3 credits (with permission of instructor) and attend the W drill and the 204 F lecture.

Prerequisites: for Japanese 201, Japanese 203 or placement by the instructor during registration; for Japanese 202, Japanese 201 and 204 or placement by the instructor during registration.


Reading of elementary texts with emphasis on expository style.

203–204 Intermediate Japanese Conversation 203, fall; 204, spring. 4 credits each term. Prerequisites: for Japanese 203, Japanese 202 or placement by the instructor during registration; for Japanese 204, Japanese 203, 205, or 223, or placement by the instructor during registration.


Training in listening and speaking for students who have acquired a basic oral proficiency.

205–206 Intermediate Japanese Reading I and Conversation 205, fall; 206, spring. 6 credits each term. Prerequisites: for Japanese 205, Japanese 202 or placement by the instructor during registration; for Japanese 206, Japanese 201 or placement by the instructor during registration.

Lecs. M W F 1:25; drill, M–F 10:10 or 2:30. Staff.

A combination of Japanese 201–202 and 203–204, for students interested in developing both written and oral skills.

[223 Transition to Intermediate Japanese Conversation 201–202. 6 credits. Prerequisite: Japanese 160 (Cornell intensive summer course) or placement by the instructor during registration. Not offered 1987–88.

Lecs. T R 1:25 plus one hour to be arranged; drills, M–F 12:20. Staff.

Provides transition, primarily for summer course students, into regular program. After Japanese 223 the students will have covered some material that 202 students have covered. Japanese 223 satisfies prerequisite for 204 but not for 206. Recommended also for students with insufficient background to qualify for Japanese 203, determined by examination during registration period.]

241–242 Intermediate Japanese for Business Purposes 241, fall; 242, spring. 4 credits each term. Prerequisites: for Japanese 241, Japanese 142 or placement by the instructor during registration; for Japanese 242, Japanese 241 or placement by the instructor during registration. (For undergraduates only Graduates, see Japanese 543–544.)


Intermediate Japanese for students in international business and economics.

301–302 Intermediate Japanese Reading II 301, fall; 302, spring. 4 credits each term. Prerequisites: for Japanese 301, Japanese 202 or 206 or placement by the instructor during registration; for Japanese 302, Japanese 201 or placement by the instructor during registration.

M W F 2:30; lec to be arranged. Staff.

Reading of selected modern texts with emphasis on expository style.

303–304 Communicative Competence 303, fall; 304, spring. 3 credits each term. May be repeated for credit. Prerequisite: Japanese 303, Japanese 204 or 206 or placement by the instructor during registration; for Japanese 304, Japanese 303 or placement by the instructor during registration.

M W F 1:25. Staff.

Drill in the use of spoken Japanese within the constraints set by Japanese social settings.

[341–342 Advanced Japanese for Business Purposes 341, fall; 342, spring. 4 credits each term. Prerequisite: permission of instructor. Not offered 1987–88. Hours to be arranged. Staff.

This course is designed to prepare upperclassmen for the business world by providing them with the skills necessary to function effectively in a Japanese business environment. Emphasis is placed on the development of both oral and written communication skills.

401–402 Advanced Japanese Reading 401, fall; 402, spring. 4 credits each term. Prerequisites: for Japanese 401, Japanese 302 or placement by the instructor during registration; for Japanese 402, Japanese 401 or placement by the instructor during registration.

M W F 2:30; lec to be arranged. Staff.

Reading of selected modern texts with emphasis on expository style.

404 Linguistic Structure of Japanese 404. 4 credits. Prerequisites: Japanese 102 or permission of instructor and Linguistics 101. Hours to be arranged. J. Whitman.

407–408 Oral Narration and Public Speaking 407, fall; 408, spring. 2 credits each term. May be repeated for credit. Prerequisites: for Japanese 407, Japanese 304 or placement by the instructor during registration; for Japanese 408, Japanese 407 or placement by the instructor during registration.

T R 1:25. Staff.

Instruction in storytelling, lecturing, and speechmaking, with emphasis on both the construction of discourse and Japanese patterns of oral delivery.

421–422 Directed Readings 421, fall; 422, spring. Credit to be arranged. Limited to advanced students and offered according to staff-time availability.

Prerequisite: placement by the instructor during registration.

Hours to be arranged. Staff.

Topics are selected on the basis of student needs.


M–F 1:25. Staff.

For description see Japanese 414–142.


FALCON

J. Whitman, 308 Morrill Hall (255-0712); R. Sukle, 412 Morrill Hall (255-0734).

161–162 Intensive Japanese (FALCON) 161, fall; 162, spring. 16 credits each term. Prerequisite: for Japanese 161, Japanese 102 or 160 (Cornell summer intensive course) or placement by the instructor during registration; for Japanese 162, Japanese 161 or placement by the instructor during registration.

M–F, 6 hours each day. J. Whitman, R. Sukle, and staff.

Literature in Japanese

405 Introduction to Modern Literary Japanese Fall. 4 credits. Prerequisite: Japanese 302 or permission of instructor.

Hours to be arranged. Staff.

Readings of selected works of modern Japanese literature.

406 Introduction to Classical Japanese Spring. 4 credits. Prerequisite: Japanese 405 or permission of instructor.

Hours to be arranged. K. Brazell.

An introduction to the grammar and styles of premodern Japanese. Selected readings from literature of various periods.

421–422 Directed Readings 421, fall; 422, spring. Credit to be arranged. Prerequisites: for Japanese 421, Japanese 402 or equivalent; for Japanese 422, Japanese 421 or equivalent.

Hours to be arranged. Staff.

Topics are selected on the basis of student needs.

611 Seminar in Modern Literature Fall or spring on demand. 2–4 credits. Prerequisite: permission of instructor.

Hours to be arranged. Staff.

612 Seminar in Classical Literature Fall or spring on demand. 2–4 credits. Prerequisite: permission of instructor.

Hours to be arranged. K. Brazell.

621–622 Advanced Directed Readings 621, fall; 622, spring. Credit to be arranged. Prerequisite: permission of instructor.

Hours to be arranged. Staff.

Note: See courses listed under Department of Asian Studies for Japanese literature courses in translation.

Javanese

131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisites: for Javanese 131, qualification in Indonesian, for Javanese 132, Javanese 131 or equivalent.

Hours to be arranged. J. U. Wolff.

An elementary language course for those who have had no previous experience in the language.

133–134 Continuing Course 133, fall; 134, spring. 3 credits each term. Prerequisites: for Javanese 133, Javanese 132 or equivalent; for Javanese 134, Javanese 133 or equivalent.

Hours to be arranged. J. U. Wolff.

203–204 Directed Individual Study 203, fall; 204, spring. 3 credits. Prerequisite: Javanese 134 or equivalent.

Hours to be arranged. J. U. Wolff.

This is a practical language course on an intermediate level in which the students will work through readings and conversations under the guidance of a native speaker for three contact hours a week.

Old Javanese

See Linguistics 651–652.

Linguistics

Linguistics, the systematic study of human speech, lies at the crossroads of the humanities and the social sciences, and much of its appeal derives from the special combination of intuition and rigor that the analysis of language demands. The interests of the members of the Department of Modern Languages and Linguistics span most of the major subfields of linguistics—phonetics and phonology, the study of speech sounds; syntax, the study of sentence structure; semantics, the study of meaning; historical linguistics, the study of language change in time; sociolinguistics, the study of language as a social and cultural artifact; and applied linguistics, which relates the results of linguistic research to problems of bilingual education, second-language learning, and similar practical concerns. Although the gulf between the study of language in general and the study of particular languages, such as Spanish or German, may seem very wide, the two are actually intimately connected in a
101—102 Theory and Practice of Linguistics

101, fall or summer; 102, spring. 4 credits each term.

M W F 11:15; disc to be arranged. J. Gair and staff.

An introductory course designed to provide an overview of the science of language, especially its theoretical underpinnings, methodology, and major findings. Linguistics 101 plus any other course in linguistics or any DMLL course for which Linguistics 101 is a prerequisite satisfies the social science distribution requirement.

111 Themes in Linguistics

Fall. 4 credits. Intended primarily for nonmajors. Prospective linguistics majors should see Linguistics 101—102.

M W F 10:00. J. Whitman.

Basic linguistic concepts are introduced and the relationship of linguistics to other disciplines is explored, with emphasis on biological, historical, social, and cultural contexts of language use.

113—114 Hispanic Bilingualism

113, fall; 114, spring. 3 credits each term. Linguistics 113 is not a prerequisite for 114. Freshman Seminar.


An introductory sociolinguistics course on the speech of the Hispanic bilingual in the United States. Fall semester topics include the relationship between standard languages and dialects, ethnicities, English code switching vs. interference, and variation related to social factors. Spring semester topics concentrate on variation in the use of Spanish and English in the different Hispanic communities established in the United States.

118 Varieties of Human Language

Spring. 3 credits.


Language diversity has a place in our complex world. Whether spoken by a handful of speakers or by hundreds of millions, each language manages the same tasks of communication and fits in with its social environment. Language identification, literacy, and multilingualism are among the issues touched on. Applicable toward the social science distribution requirement.

[200 Traditional English Grammar for Foreign Language Students

Fall. 1 credit. Open only to students concurrently enrolled in a foreign language course. S-U grades only. Not offered 1987—88.

W 11:15. H. L. Kufner.

Rapid review of grammatical terminology and those features and processes of English that are of particular relevance and usefulness in the learning of French, German, Italian, or Spanish. Weekly homework assignments; no prelims; no final examinations.

[220 Linguistics for Students of Literature (also Comparative Literature 220)


Hours to be arranged. L. Waugh.

Since literature is merely a highly specialized sector of language in general, the science of language has much to contribute even to humanists whose primary interest is literary texts. This course will survey many of the basic linguistic divisions: phonology, morphology, syntax, semantics and lexical change and will explore in some depth the implications of all the selected topics for literary studies.

[244 Language and the Sexes (also Women's Studies 244)

Spring. 4 credits. For nonmajors or majors. Not offered 1987—88.

Hours to be arranged. S. McConnell-Ginet.

[264 Language, Mind, and Brain

Spring. 4 credits. For nonmajors or majors. Not offered 1987—88.


A survey of what is currently known about the structure and function of natural language, with emphasis on the following topics: the basic biology of language, mental representation of linguistic knowledge, mechanisms of linguistic performance, universal grammar and the modularity hypothesis, and language and cognition.

300 Multilingual Societies and Cultural Policy

Spring. 4 credits.


An interdisciplinary analysis of the impact of bilingualism on society, particularly in education and communication arts. The FLEX model is used to suggest a method of evaluating policy and program alternatives.

301—302 Phonology I, II

301, fall; 302, spring. 4 credits each term. Prerequisite for 302: Linguistics 301 or permission of instructor.


An introduction to contemporary phonology, which studies the system of rules and representations underlying the human ability to produce and understand speech. 301: an overview of descriptive phonology; 302: phonological principles and their interaction, distinctive features, and the syllable. 302: using American English as a case study, explores in detail the nature of rule systems and rule interaction, the phonological cycle, levels of representation, lexical and morphological conditioning of rules, and the relation between phonology and syntax.

303—304 Syntax I, II

303, fall; 304, spring. 4 credits each term. Prerequisite for 304: Linguistics 303 or permission of instructor.


303 is an introduction to syntactic theory, with emphasis on the classical theory of transformational grammar. 304 is an advanced course, surveying current syntactic models and dealing with such issues as the nature of syntactic representation, levels of representation, principles of universal grammar, and the relation of syntax and semantics.

306 Functional Syntax

Fall. 4 credits. Prerequisite: Linguistics 102 or permission of instructor.


A general survey of syntactic theories that highlight grammatical function and reveal its role in discourse structure.

309—310 Morphology I, II

309, fall; 310, spring. 4 credits each term. Prerequisite: Linguistics 101 or equivalent or permission of instructor.


309 is a general survey focusing on the relationship of meaning and form in morphology and introducing techniques of morphological analysis. Current research on form-meaning questions is discussed. 310 considers recent discussions in morphological theory.

[311—312 The Structure of English

311, fall; 312, spring. 4 credits each term. Prerequisites: for Linguistics 311, Linguistics 102 or permission of instructor; for Linguistics 312, Linguistics 311 or permission of instructor. Offered alternate years. Not offered 1987—88.

Hours to be arranged. Staff.

311 provides an overview of the syntactic structure of English, drawing upon relevant theoretical approaches. 312 deals with phonology, morphology, and special problems of English structure and semantics.

313 English for Teachers of English

Fall. 4 credits. Prerequisite: for undergraduate majors, Linguistics 101—102 or equivalent; for graduate students, concurrent registration in Linguistics 101 or equivalent.

M W F 11:15; plus one hour to be arranged. M. Martin.

A course in modern English for teachers of nonnative speakers. An analysis of the phonetics, grammar, and semantics of the language in terms applicable to both classroom teaching and materials development.

314 Teaching English as a Foreign Language

Spring. 4 credits. Prerequisite: Linguistics 313.

A course designed to meet the needs of teachers of English as a second language, particularly in the areas of teaching reading, writing, and grammar with an emphasis on vocabulary building, sentence construction, and paragraph structure.
English language skills to nonnative speakers are examined. Attention is given to materials design and to current issues and new trends in the fields.

316 Introduction to Mathematical Linguistics
Spring. 4 credits. Prerequisite: Linguistics 101 - 102 or equivalent. Offered alternate years.
Hours to be arranged. F. Landman.
The course is an introduction to the mathematical concepts and techniques most frequently used in theoretical linguistics. Topics will include the following: elementary set theory, elementary logic, formal systems and algorithms, and trees, automata, and formal grammars. The course is designed for students who are interested in formal linguistics but feel they have a weak mathematical background. It presupposes no previous knowledge of formal methods and it will try to overcome any “anxiety” that such methods may give rise to.

318 Style and Language
Fall. 4 credits.
Prerequisite: Linguistics 101 or permission of instructor. Not offered 1987-88.
T R 1-2; 15. Staff.

319 Phonetics I
Fall. 3 credits.
TR 8:40-9:55; disc to be arranged. J. Kingston.
An introduction to phonetic theory, with an equal emphasis on the general properties of speech production, acoustics, and perception. Training in production and transcription in a discussion section.

320 Phonetics II
Spring. 3 credits. Prerequisite: Linguistics 251.
TR 8:40-9:55; disc to be arranged. J. Kingston.
Surveys current controversies in phonetics research selected from the areas of articulation, acoustics, and perception, including the possibility of phonetic explanation in phonology, focusing both on origin and development of recurrent sound patterns in languages and on the testing of the psychological reality of theoretical constructs in phonology.

321 History of the Romance Languages
Fall. 4 credits. Prerequisite: Linguistics 101 or equivalent, and qualification in any Romance language. Offered alternate years. M W F 1:25.

323 Comparative Romance Linguistics
Fall. 4 credits. Prerequisite: Linguistics 101 or equivalent, and qualification in any Romance language. Offered alternate years. Not offered 1987-88.
M W F 2:30. C. Rosen.
The Romance language family in a typological perspective. Salient features of eight Romance languages; broad and localized trends in phonology, syntax, and the lexicon; and elements of dialectology.

325 Pragmatics
Fall. 4 credits. Prerequisite: Linguistics 102 or permission of instructor. Not offered 1987-88.
An introduction to the study of such topics as speech acts, presupposition, deixis, implicatures, and conversational strategies.

341 Indis as a Linguistic Area
Spring, according to demand. 4 credits. Prerequisite: Linguistics 102 or permission of instructor.
Hours to be arranged. J. W. Gair. G. Kelley.
A basic introduction to the linguistic and sociolinguistic character of the subcontinent, with special attention to cross-linguistic family influences and convergence.

366 Spanish in the United States (also Spanish 366)
Spring. 4 credits. Prerequisite: some knowledge of Spanish. Offered alternate years. Counts toward the social science distribution requirement.

Examination of major Spanish dialects in the United States from a linguistic perspective. Contrast with the standard language. Borrowing, interference, and code switching. Syntactic, morphological, and phonological characteristics. Sex-related phenomena.

400 Semiotics and Language (also Comparative Literature 410)
Spring. 4 credits. Prerequisites: some background in linguistics, philosophy, psychology, anthropology, or literary theory or permission of instructor. Not offered 1987-88.
M W F 2:30-3:45. L. R. Waugh.
An introduction to the study of semiotics in general and to particular semiotic theories (for example, those of Saussure, Peirce, Jakobson) and to language as a semiotic system.

401 Language Typology
Fall. 4 credits.
Prerequisite: Linguistics 101 - 102 or equivalent.
Study of a basic question of contemporary linguistics: in what ways do languages differ, and in what ways are they all alike? Efforts to characterize the total repertory of constructions available to natural languages and to formalize syntactic universals plainly. Common morphological devices and their syntactic correlates. Emphasis on systematic case, agreement, and anaphora. Common morphological devices and their syntactic correlates. Emphasis on two approaches to universals: (1) relational grammar and (2) the work of Joseph Greenberg.

402 Languages in Contact
Fall. 4 credits.
Prerequisite: Linguistics 101 - 102 or permission of instructor. Offered alternate years. Not offered 1987-88.
M W F 9:05. H. L. Kufner.
Examination of a variety of areas where languages exhibit interference phenomena: diglossia, bilingualism, dialects, second-language acquisition.

403 Introduction to Applied Linguistics
Fall. 4 credits.
Prerequisite: a course in the structure of a language at the 400 level. Not offered 1987-88.
Examination of the theoretical bases of applied linguistics, including second-language learning and current language-teaching methodologies.

404-406 Sociolinguistics
405, fall; 406, spring. 4 credits each term. Prerequisite: Linguistics 101 - 102 or permission of instructor. Linguistics 405 is not a prerequisite to 404. Not offered 1987-88.
405: Social differences in the use of language according to sex, class, age, race, situation, etc. Societal multilingualism; diglossia, etc. Social attention to language: norms and standards, taboo and euphemism, and language planning. 406: The study of language variation. Theoretical and methodological issues in the study of sociolinguistic differences. Variable rules, locating variation in the grammar, and quantitative methods in linguistics.

410 Introduction to Historical Linguistics
Spring. 4 credits.
Prerequisite: Linguistics 102 or permission of instructor.
A survey of the basic mechanisms of linguistic changes, with examples from a variety of languages.

411 Cognitive Studies: Knowledge, Belief, and Mental Representations (also Psychology 518)
Fall. 4 credits.
Prerequisite: permission of instructor. Hours to be arranged. F. Landman and staff.
An interdisciplinary seminar on issues surrounding theories of knowledge and belief and their semantic consequences, team-taught by linguists, philosophers, psychologists, and computer scientists.

415-416 Social Functions of Language
415, fall; 416, spring. 4 credits each term. Prerequisites: Linguistics 101 or permission of instructor. Not offered 1987-88.
Hours to be arranged. G. Kelley.

The function of language in society; social constraints on linguistic behavior; including taboos, jargons, registers, social, and socially perceived dialects.

417 History of the English Language
Spring. 4 credits.
Prerequisite: permission of instructor.
M W F 1:25. G. Kelley.
Development of modern English: external history; phonological, grammatical, and lexical change. The English language in America.

421-422 Semantics I, II
421, fall; 422, spring. 4 credits each term. Prerequisites: for Linguistics 421, Linguistics 102; for Linguistics 422, Linguistics 421 or permission of instructor.
421 is an introduction to central issues and techniques in recent work on the semantic structure of natural languages. 422revives neglected older developments.

425-426 Structure of Bantu I and II
425, fall; 426, spring. 4 credits each term. Prerequisites: for Linguistics 425, Linguistics 301 or permission of instructor; for Linguistics 426, Linguistics 303 and 425 or permission of instructor. Not offered 1987-88.
Hours to be arranged. G. N. Clements.
425 is an introduction to descriptive and historical Bantu linguistics. Following a review of basic features of Proto-Bantu grammar and lexicon, we examine the phonology and morphology of a selected Bantu language with the help of a native speaker assistant. 426 is a sequel to Linguistics 425 and investigates aspects of Bantu syntax and its relation to phonology, morphology, and discourse function.

436 Language Development (also Psychology 436 and Human Development and Family Studies 436)
Spring. 4 credits.
Prerequisite: Linguistics 425; at least one course in developmental psychology, cognitive psychology, cognitive development, or linguistics. Offered alternate years. Not offered 1987-88.
T R 10:10-12; 15. disc; T R 11:30-12:50. B. Lust.
A survey of basic issues, methods, and research on study of first-language acquisition. Major theoretical fields in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics. The fundamental linguistic issues of universal grammar and the biological foundations for acquisition are discussed, as are the issues of relations between language and thought. The acquisition of communication systems in nonhuman species such as chimpanzees are addressed, but major emphasis is on the chimp.

440 Dravidian Structures
Spring, according to demand. 4 credits. Prerequisite: Linguistics 102. Hours to be arranged. G. Kelley.
A comparative and contrastive analysis of the structures of several Dravidian languages.

442 Indo-Aryan Structures
Fall, according to demand. 4 credits. Prerequisite: Linguistics 102. Hours to be arranged. J. W. Gair.
Typological discussion of the languages of the subfamily, phonology and grammar.

493 Honors Thesis Research
Fall. 4 credits.
Hours to be arranged. Staff.
May be taken before or after Linguistics 494, or may be taken independently.

494 Honors Thesis Research
Spring. 4 credits.
Hours to be arranged. Staff.
May be taken as a continuation of, or before, Linguistics 493.

600 Field Methods
Fall or spring. 4 credits.
Prerequisites: Linguistics 101 or 102.
Hours to be arranged. G. Diffloth.
Elicitation, recording, and analysis of data from a native speaker of a non-Western language not generally known to students.
601 Topics in Phonological Theory Fall. 4 credits. Prerequisite: Linguistics 301 and one other course in phonology. Hours to be arranged. Staff. Selected topics in current phonological theory.

602 Proseminar: Introduction to Graduate Study Spring. 4 credits. Primarily for first-year graduate students majoring in general linguistics but, with permission of instructor, open to those minorin linguistics or majoring in the linguistics of specific languages. Hours to be arranged. J. Gair, W. Habert. The focus of the course is the structure of linguistic arguments. Participants take turns leading discussions and analysis of papers related to some central theoretical issues in linguistics. The course culminates in a symposium in which students present original research papers.


604 Research Workshop Spring. 4 credits. Prerequisite: three or more semesters of graduate study in linguistics. Hours to be arranged. Staff. Participants will present their own ongoing research and discuss it with their colleagues. Individual topics will be chosen on the basis of interest, experience, and probable focus of dissertation research.

608 Discourse Analysis Fall. 4 credits. Prerequisite: permission of instructor. M 2:30–4:30. J. E. Grimes. Linguistic theory applied to relationships beyond the sentence.

609 Greek Comparative Grammar (also Classics 421) Fall. 4 credits. Prerequisite: thorough familiarity with the morphology of classical Greek. M W F 10:10. A. Nussbaum. The prehistory and evolution of the sounds and forms of ancient Greek as reconstructed by comparison with the other Indo-European languages.

610 Latin Comparative Grammar (also Classics 422) Fall or spring. 4 credits. Prerequisite: thorough familiarity with the morphology of classical Latin. Not offered 1987–88. Hours to be arranged. A. Nussbaum. The prehistory and evolution of the sounds and forms of classical Latin as reconstructed by comparison with the other Indo-European languages.

611 Greek Dialects (also Classics 425) Fall or spring. 4 credits. Not offered 1987–88. Hours to be arranged. A. Nussbaum. A survey of the dialects of ancient Greek through the reading and analysis of representative epigraphical and literary texts.

612 Italic Dialects (also Classics 424) Fall or spring. 4 credits. Not offered 1987–88. Hours to be arranged. A. Nussbaum. The phonology and morphology of Faliscan, Oscan, and Umbrian studied through the reading of epigraphical texts. Attention to the relations of these languages to Latin and the question of proto-italic.

613 Homeric Philology (also Classics 427) Fall or spring. 4 credits. Prerequisite: ability to read Homeric Greek. Not offered 1987–88. Hours to be arranged. A. Nussbaum. The language of the Homeric epics: dialect background, archaism, epicisms, and modernizations. The notion of a Kunstsprache: its constitution, use, and internal consistency. The phonological and morphological aspects of epic compositional technique.

614 Archaic Latin (also Classics 426) Fall or spring. 4 credits. Prerequisite: reading knowledge of Latin. Not offered 1987–88. Hours to be arranged. A. Nussbaum. Reading of epigraphic and literary precritical texts with special attention to archaic and dialectal features. The position of Latin among the Indo-European languages of ancient Italy, the rudiments of Latin historical grammar, and aspects of the development of the linguistic language.

615 Mycenaean Greek (also Classics 429) Fall or spring. 4 credits. Prerequisite: thorough familiarity with the morphology of classical Greek. Not offered 1987–88. Hours to be arranged. A. Nussbaum. An introduction to the epigraphy, language, and content of the Linear B tablets with special attention to their implications for Greek historical grammar and dialectology.

617–618 Hittite 617, fall; 618, spring. 4 credits each term. Prerequisites: for Linguistics 617, permission of instructor; for Linguistics 618, Linguistics 617 or permission of instructor. Not offered 1987–88. Hours to be arranged. J. Jasanoft.

619 Rigveda Fall. 4 credits. Not offered 1987–88. Hours to be arranged. J. Jasanoft. Reading and linguistic analysis of selected Vedic hymns.


621 Problems and Methods in Romance Linguistics Spring. 4 credits. Prerequisite: one syntax course and qualification in two Romance languages. Offered alternate years. Not offered 1987–88. Hours to be arranged. C. Rosen. Central topics in Romance syntax in the light of current theories of universal grammar.


623–624 Old Irish 623, fall; 624, spring. 4 credits each term. Prerequisite for 624: 623 or permission of instructor. Hours to be arranged. J. Jasanoft.

625–626 Middle Welsh 625, fall; 626, spring. 4 credits each term. Prerequisites: for Linguistics 625, knowledge of one ancient or medieval European language or permission of instructor; for Linguistics 626, Linguistics 625 or equivalent. Not offered 1987–88. Hours to be arranged. Staff.

627 Advanced Old Irish Spring. 3 credits. Prerequisite: one year of Old Irish. Not offered 1987–88. Hours to be arranged. Staff.


633 Seminar in First-Language Acquisition: Cross-linguistic Studies of the Acquisition of Anaphora (also Human Development and Family Studies 633) Fall or spring. 1–4 credits. Prerequisite: Linguistics 436 or equivalent or permission of instructor. Hours to be arranged. B. Lust.

This seminar will review and critique current theoretical and experimental studies of the first-language acquisition of anaphora, with a concentration on insights gained by cross-linguistic study of this area. The seminar will focus on relating current developments in linguistic theory regarding anaphora to current experimental research on first-language acquisition of anaphora. Attention will also be given to the development of research proposals.

635–636 Indo-European Workshop 635, fall; 636, spring. 4 credits each term. Prerequisite: permission of instructor. Not offered 1987–88. Hours to be arranged. Fall: A. Nussbaum; spring: J. Jasanoft. An assortment of subjects intended for students with previous training in Indo-European linguistics: problems in the reconstruction of Proto Indo-European, topics in the historical grammars of the various IE languages, reading and historical linguistic analysis of texts, and grammatical sketches of "minor" IE languages.

640 Elementary Pali Fall or spring, according to demand. 3 credits. Hours to be arranged. J. W. Gair. An introduction to the language of the canonical texts of Theravada Buddhism. Reading of authentic texts, with emphasis on both content and grammatical structure.

641–642 Elementary Sanskrit 641, fall; 642, spring. 3 credits each term. Prerequisite for Linguistics 642: Linguistics 641. Hours to be arranged. Fall: A. Nussbaum; spring: J. Jasanoft.

647–648 Speech Synthesis by Rule 647, fall; 648, spring. 4 credits each term. Prerequisite: phonology and phonetics or knowledge of computer programming and permission of instructor. Hours to be arranged. H. F. Hertz. Linguistics 647 is an introduction to the techniques used in speech synthesis by rule. Particular emphasis will be given to synthesizing English with a consideration of how to derive phonological representation (e.g., phonemes and syllables) from ordinary spelling and how to derive acoustic synthesizer values on the basis of these representations. Students will have hands-on experience synthesizing speech in the Cornell Phonetics Laboratory. In Linguistics 648 students will work on synthesis projects of their choice using the Delta System (special rule-development tool) to write synthesis rules for some aspect of a selected language.

651–652 Old Javanese Fall or spring, according to demand. 4 credits. Hours to be arranged. J. U. Wolff. Grammar and reading of basic texts.

653–654 Seminar in Southeast Asian Linguistics 653, fall; 654, spring. 4 credits each term. Prerequisite: Linguistics 303 or permission of instructor. Linguistics 653 is not a prerequisite for 654. Hours to be arranged. D. J. Lief. Languages of mainland Southeast Asia. Topics, chosen according to student interests, may include description, dialectology, typology, comparative reconstruction, and historical studies.

655–656 Seminar in Austronesian Linguistics 655, fall; 656, spring. 4 credits each term. Prerequisites: for Linguistics 655, Linguistics 102 and permission of instructor; for Linguistics 656, Linguistics 655. Hours to be arranged. J. U. Wolff. Descriptive and comparative studies of Malay-Polynesian languages.

657–658 Seminar in Austrasiatic Linguistics 657 fall; 658, spring. 4 credits each term. Prerequisites: Linguistics 102 and permission of instructor.
Hours to be arranged. G. Diffloth.

Descriptive and comparative studies of Austroasiatic languages.

700 Seminar Fall or spring, according to demand. Credit to be arranged.

Hours to be arranged. Staff.

Seminars are offered according to faculty interest and student demand. Topics in recent years have included subject and topic, Montague grammar, speech synthesis, lexicography, classical and autonomous phonology, Japanese sociolinguistics, relational grammar, semantics and semiotics, and others.

701–702 Directed Research 701, fall; 702, spring. 1–4 credits.

Hours to be arranged. Staff.

753 Tibeto-Burman Linguistics Fall. 4 credits. Prerequisites: Linguistics 404 or equivalent, and permission of instructor.

Hours to be arranged. G. Diffloth.

Comparative reconstruction of Tibeto-Burman, with emphasis on the Lolo-Burmese branch and historical study of Burmese.

Additional Linguistics Courses

Cambodian 404 Structure of Cambodian
[Chinese 401 History of the Chinese Language]
Chinese 403 Linguistic Structure of Chinese I
Chinese 404 Linguistic Structure of Chinese II
[Chinese 405 Chinese Dialects]
[Chinese 607 Chinese Dialect Seminar]
[French 401 History of the French Language]
[French 407 Applied Linguistics: French]
French 408 Linguistic Structure of French
French 410 Semantic Structure of French
[French 602 Linguistic Structure of Old and Middle French]
[French 604 Contemporary Theories of French Grammar]
French 700 Seminar in French Linguistics
German 401 Introduction to Germanic Linguistics
[German 402 History of the German Language]
[German 403 Modern German Phonology]
German 404 Modern German Syntax
[German 405 German Dialectology]
German 406 Runology
[German 407 Applied Linguistics: German]
[German 408 Linguistic Structure of German]
German 602 Gothic
[German 603 Old High German, Old Low Franconian]
[German 604 Old Saxon, Old Frisian]
German 605 Structure of Old English
[German 606 Topics in Historical Germanic Phonology]

[German 607 Topics in Historical Germanic Morphology]
[German 608 Topics in Historical Germanic Syntax]
German 609–610 Old Norse
[German 611 Readings in Old High German and Old Saxon]
[German 612 Germanic Tribal History]
German 710 Seminar in Germanic Linguistics
[German 720 Seminar in Comparative Linguistic Germanic Studies]
[German 730 Seminar in German Linguistics]
German 740 Seminar in Dutch Linguistics
[Hindi 401 History of Hindi]
Hindi 700 Seminar in Hindi Linguistics
Indonesian 300 Linguistic Structure of Indonesian
[Italian 402 History of the Italian Language]
Italian 403 Linguistic Structure of Italian
[Italian 432 Italian Dialectology]
Italian 631 Readings in Italian Opera Libretti
[Italian 700 Seminar in Italian Linguistics]
Japanese 404 Linguistic Structure of Japanese
[Portuguese 700 Seminar in Portuguese Linguistics]
Quechua 403 Linguistic Structure of Quechua
Quechua 700 Seminar in Quechua Linguistics
Russian 301–302 Advanced Russian Grammar and Reading]
Russian 401–402 History of the Russian Language
[Russian 403–404 Linguistic Structure of Russian]
Russian 601 Old Church Slavic
Russian 602 Old Russian
Russian 651–652 Comparative Slavic Linguistics
Russian 700 Seminar in Slavic Linguistics
Spanish 401 History of the Spanish Language
Spanish 407 Applied Linguistics: Spanish
[Spanish 408 The Grammatical Structure of Spanish]
[Spanish 601 Hispanic Dialectology]
[Spanish 602 Linguistic Structure of Ibero-Romance]
[Spanish 603 Contemporary Theories of Spanish Phonology]
[Spanish 604 Contemporary Theories of Spanish Grammar]
Spanish 700 Seminar in Spanish Linguistics

[Tagalog 300 Linguistic Structure of Tagalog]

Nepali

101–102 Elementary Nepali 101, fall; 102, spring. 6 credits each term. Prerequisite: for Nepali 102, Nepali 101 or examination.

Hours to be arranged. K. S. March and staff.

Intended for beginners or students placed by examination. The emphasis is on basic grammar and speaking and comprehension skills, utilizing culturally appropriate materials and texts. Devanagari script for reading and writing is also introduced.

201–202 Intermediate Nepali Conversation 201, fall; 202, spring. 3 credits each term. Prerequisites: for Nepali 201, Nepali 102 or examination; for Nepali 202, Nepali 201 or examination.

Hours to be arranged. K. S. March and staff.

Intermediate instruction in grammar and speaking and verbal comprehension skills, with special attention to developing technical vocabularies and other verbal skills appropriate to students’ professional fields.

203–204 Intermediate Nepali Composition 203, fall; 204, spring. 3 credits each term. Prerequisites: for Nepali 203, Nepali 102 or examination; for Nepali 204, Nepali 203 or examination.

Hours to be arranged. K. S. March and staff.

A systematic review of written grammar and reading comprehension, with special attention to the technical vocabularies, necessary writing skills, and published materials typical of advanced students’ professional fields.

Pali

See Linguistics 640.

Polish

[131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Polish 132: Polish 131 or equivalent. Offered alternate years. Not offered 1987–88.]

M W F 10:10 or 1:25. E. W. Browne.

133–134 Continuing Course 133, fall; 134, spring. 3 credits each term. Prerequisites: for Polish 133, Polish 132 or equivalent; for Polish 134, Polish 133 or equivalent.

Hours to be arranged. E. W. Browne.

Portuguese

Language and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Intended for beginners or for those who have been placed in the course by examination. Students may attain qualification upon completion of 122 by achieving a satisfactory score on a special examination.


A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

203–204 Intermediate Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Portuguese 200, qualification in Portuguese; for Portuguese 204, Portuguese 203 or permission of instructor.


Conversation grammar review with special attention to pronunciation and the development of accurate and idiomatic oral expression. Includes readings in contemporary Portuguese and Brazilian prose and writing practice.

303–304 Advanced Composition and Conversation 303, fall; 304, spring. 4 credits each term. Prerequisite: for Portuguese 303, Portuguese 204 or equivalent; for Portuguese 304, Portuguese 303 or equivalent.

Hours to be arranged. J. Oliveira.
Selected problems in the structure of Portuguese.)

[305-306] Readings in Luso-Brazilian Culture 3, fall; 306, spring. 4 credits each term. Prerequisites: Portuguese 204 or equivalent or permission of instructor. Not offered 1987–88.

Hours to be arranged. Staff.

[700] Seminar in Portuguese Linguistics Fall or spring, according to demand. 4 credits. Not offered 1987–88.

Hours to be arranged. Staff.

Selected problems in the structure of Portuguese.)

Literature


Quechua

131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite: qualification in Spanish.

Hours to be arranged. D. F. Solá.

A beginning conversation course in the Cuzco dialect of Quechua.

133–134 Continuing Course 133, fall; 134, spring. 3 credits each term. Prerequisites: for Quechua 133, Quechua 131–132 or equivalent; for Quechua 134, Quechua 133 or equivalent.

Hours to be arranged. D. F. Solá.

An intermediate conversation and reading course. Study of the Huarochoi manuscript.

135–136 Quechua Writing Lab 135, fall; 136, spring. 1 credit each term. Prerequisites: concurrent enrollment in Quechua 131–132 or instructor’s approval. Letter grade only.

Hours to be arranged. D. F. Solá.

Computer-assisted drill and writing instruction in elementary Quechua.

403 Linguistic Structure of Quechua Fall. 4 credits.

Hours to be arranged. D. F. Solá.

Quechua.

700 Seminar in Quechua Linguistics Fall or spring. Credit to be arranged. Prerequisite: permission of instructor.

Hours to be arranged. D. F. Solá.

Romance Linguistics and Literature

Linguistics

321 History of the Romance Languages Fall. 4 credits. Prerequisite: Linguistics 101 or equivalent, and qualification in any Romance language. Offered alternate years.

M W F 1:25. C. Rosen.

For description see Linguistics 321.

[323] Comparative Romance Linguistics Fall. 4 credits. Prerequisite: Linguistics 101 or equivalent, and qualification in any Romance language. Offered alternate years.


Hours to be arranged. C. Rosen.

For description see Linguistics 323.


Hours to be arranged. J. S. Noblit.

For description see Linguistics 620.

[621] Problems and Methods in Romance Linguistics Spring. 4 credits. Prerequisite: one syntax course and qualification in two Romance languages. Offered alternate years. Not offered 1987–88.

Hours to be arranged. C. Rosen.

For description see Linguistics 621.


Hours to be arranged. C. Rosen.

For description see Linguistics 622.

See also Latin 523, Vulgar Latin.

Literature

109 Freshman Writing Seminar: Techniques of Interpretation, An Introduction to Semiotics (also French 109) Fall or spring. 3 credits.

M W F 9:05 or 1:25. Staff.

In its broadest meaning, semiotics is the study of signs that carry information: roadside signs, fashions, advertisements, publicities, literary modes. This course, which does not presuppose prior technical knowledge, will introduce the students to a critical reading of signs: the signifier (the concrete expression of the sign) and the signified (the message) and their various interactions. Readings will include such books as R. Barthes, Mythologies, or T. Hawkes, Structuralism and Semiotics. Exercises will be essays on how to analyze various signs taken from practical experience, such as advertisements from magazines or TV, or from cultural phenomena (fashion codes, artistic modes).

361 The Culture of Early Renaissance (also Comparative Literature 361 and History of Art 350) Fall. 4 credits.

T R 11:40–12:30 plus disc. C. Lazzaro and E. Morris with the collaboration of M. Migiel (Romanic studies), D. Randel (music) and G. Teskey (English). Renaissance culture and society are introduced through the work of several major figures: Petrarch, Alberti, Dufay, Leonardo, Machiavelli, Erasmus, and Rabelais. Each figure will be the focal point for a critical examination of problematic issues in the areas of humanism, religious and political thought, literature, art, music, and architecture. In the discussion sections, problems of interpretation will be approached through the analysis of primary source readings and works of art.


431 Isms: General Concepts in Modern Cultural History (also Comparative Literature 431) Fall. 4 credits. Taught in English.

T R 11:40–12:55. C. Arroyo.

An attempt to define these terms: humanism, baroque, classicism, romanticism, realism, Marxism, symbolism, surrealism, existentialism, structuralism, and poststructuralism. The meaning of general terms in literary criticism. Literary criticism and literary history.

Literature and history in general.

[459] Being, God, Mind: Key Terms of Western Thought from Plato to Vico (also Comparative Literature 359) Not offered 1987–88.


497 Heldeger: Short Writings (also Comparative Literature 497 and German 497) 3 credits. Not offered 1987–88.

Romanian

131–132 Elementary Course 131, fall; 132, spring. Offered according to demand. 3 credits. Prerequisite for Romanian 132: Romanian 131 or equivalent.

133–134 Continuing Course 133, fall; 134, spring. Offered according to demand. 3 credits. Prerequisite for Romanian 134: Romanian 133 or equivalent.

Russian


R. L. Leed (director of undergraduate studies [language], 302 Morrill Hall, 255-2322), N. Poliak, M. Scammell, S. Senderovich, G. Shapiro

The Russian Major

Russian majors study Russian language, literature, and linguistics, emphasizing their specific interests. It is desirable, although not necessary, for prospective majors to complete Russian 101–102, 201–202, and 203–204 as freshmen and sophomores, since these courses are prerequisites to most of the junior and senior courses that count toward the major. Students may be admitted to the major upon satisfactory completion of Russian 102 or the equivalent. Students who elect to major in Russian should consult both Professor Gibian and Professor Leed as soon as possible. For a major in Russian, students will be required to complete (1) Russian 301–302 or 303–304 or the equivalent, and (2) 18 credits from 300- and 400-level literature and linguistics courses, of which 12 credits must be in literature in the original Russian.

Certain courses may, with the permission of the instructor, be taken for one additional hour’s credit.

Such courses will involve a one-hour section each week with work in the Russian language. These courses count one hour each of credit towards the 12 courses of Russian literature in the original language required for the major.

Study Abroad

Cornell is an affiliated institution in the program for Russian language study at Leningrad State University. Opportunities are available for study during the summer, a single semester, or the full year. Further information is available from Professor Ways Browne.

Honors

Students taking honors in Russian undertake individual reading and research and write an honors essay.

Fees

Depending on the course, a small fee may be charged for photocopied texts for course work.

Freshman writing seminar requirement.

The following courses will satisfy the freshman writing seminar requirement: Russian 103, 104, 105, and 107.

Russian and Soviet Studies Major

See “Special Programs and Interdisciplinary Studies,” which follows the department listings.

Language and Linguistics

101–102 Elementary Courses 101, fall; 102, spring. 6 credits each term. Prerequisite for Russian 102: Russian 101 or equivalent. Intended for beginners or students placed by examination and those who wish to obtain qualification within two semesters or who wish to enter the 200-level sequence the following fall semester. The sequence 101–102 covers the same material as 121–122–123 at a more intensive pace.

Lecs. T R 11:15 or 2:30; drills M–F 9:05, 12:20, or 1:25. R. L. Leed and staff.

A thorough grounding is given in all the language skills:
listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar and reading.

**121–122 Elementary Course**

Fall: 121; fall, 122; spring: 4 credits each term. Prerequisite for Russian: 122, Russian 121 or equivalent. Intended for beginners or students placed by examination. The sequence 121–122 covers the same material as 101–102 at a less intensive pace. Students who obtain a CPT achievement score of 560 after Russian 121–122 attain qualification and may enter the 200-level sequence; otherwise Russian 123 is required for qualification. Lec, F 1:25 or 2:30, drils, M T W R 9:05, 12:20, or 1:25; R. L. Leed and staff.

A thorough grounding is given in all the language skills: listening, speaking, reading, and writing. Language practice is in small groups. Lectures cover grammar and reading.

**123 Continuing Russian**

Fall or summer 4 credits. Limited to students who have previously studied Russian and have a CPT achievement score between 450 and 559. Satisfactory completion of Russian 123 fulfills the qualification portion of the language requirements.

Lec, F 12:20; drills, M T W R 12:20 or 3:35. Staff.

A prequalification course designed to prepare students for study at the 200 level. Passing this course is equivalent to qualification.

**203–204 Intermediate Composition and Conversation**

203, fall or spring; 204, spring 3 credits each term. Prerequisite: qualification in Russian. Prerequisite for Russian 204: Russian 203 or equivalent.

203, fall: M T R F 11:15, 1:25, or 2:30; spring: M T R F 9:05, L. and S. Paperno.

204, spring: M T R F 11:15, 1:25, or 2:30, L. and S. Paperno.

Guided conversation, composition, reading, pronunciation, and grammar review, emphasizing the development of accurate and idiomatic expression in the language.

**205–206 Russian for Scientists**

205, fall; 206, spring 2 credits each term. Prerequisites: for Russian 205, qualification in Russian; for Russian 206, Russian 205. Both semesters must be taken in order to satisfy the proficiency level for the language requirement. This course cannot be used to satisfy the humanities requirement.

Hours to be arranged: S. Paperno.

Reading unbridged articles on a variety of topics in social sciences, mathematics, physics, chemistry, biology, and engineering.

Note: Students placed in the 200-level courses also have the option of taking courses in introductory literature, see separate listings under Russian 201, and 202 for descriptions of these courses, any of which may be taken concurrently with the 203–204 and 205–206 language courses described above. The introductory literature courses are offered by the Department of Russian Literature, and the 203–204 and 205–206 language courses by the Department of Modern Languages and Linguistics.

**301–302 Advanced Russian Grammar and Reading**

301, fall; 302, spring 4 credits each term. Prerequisites: for Russian 301, second-year Russian or permission of instructor, for Russian 302, Russian 301. Offered alternate years. Not offered 1987–88.

T R 2:30–4: L. H. Babby.

This course is intended primarily to increase the student's active command of difficult Russian syntactic constructions. Special attention is paid to word order, impersonal sentences, negation, participle gerunds, and to the development of active vocabulary through reading modern Russian prose.

**303–304 Advanced Composition and Conversation**

303, fall; 304, spring 4 credits each term. Prerequisites: for Russian 303, Russian 204 or equivalent; for Russian 304, Russian 303 or equivalent. M W F 10:10 or 2:30. L. and S. Paperno.

**305–306 Directed Individual Study**

305, fall; 306, spring 2 credits. Prerequisites: for Russian 305, Russian 303–304 or equivalent; for Russian 306, Russian 305.

Hours to be arranged. Staff.

**401–402 History of the Russian Language**

401, fall; 402, spring 4 credits each term. Prerequisites: for Russian 401, qualification in Russian; for Russian 402, Russian 401 or equivalent. Offered alternate years.

T R 10:10–11:40; L. H. Babby.

Phonological, morphological, and syntactic developments from Old Russian to modern Russian.

**403–404 Linguistic Structure of Russian**


T R 10:10–11:40; L. H. Babby.

A synchronic study and analysis of Russian linguistic structure. Russian 403 deals primarily with phonology and morphology and 404 with syntax.

**407 Russian for Teachers**

Fall: 4 credits. Prerequisite: Russian 204 or equivalent. Not offered 1987–88.

Hours to be arranged. R. L. Leed.

Application of linguistics to language teaching; teaching methods; analysis of English and Russian, and practice teaching.

**413–414 Advanced Conversation and Stylistics**

413, fall; 414, spring 2 credits each term. Prerequisites: for Russian 413, Russian 303–304 or the equivalent, for Russian 414, Russian 413.

T R 3:35–4:25; L. and S. Paperno.

Reading and discussion of authentic unabridged Russian texts in a variety of nonliterary styles and genres.

**601 Old Church Slavic**

Fall: 4 credits. This course is prerequisite to Russian 602. Offered alternate years. M W F 10:10. E. W. Browne.

Grammar and reading of basic texts.

**602 Old Russian**

Spring 4 credits. Prerequisite: Russian 601. Offered alternate years.

Hours to be arranged. L. H. Babby.

Grammatical analysis and close reading of Old Russian texts.

**633–634 Russian for Graduate Specialists**

633, fall; 634, spring 2 credits each term. Prerequisite: four years of college Russian. For graduate students only.

Hours to be arranged. L. and S. Paperno.

The course is designed for graduate students who specialize in an area of Russian studies requiring fine active control of the language. Students will have an opportunity to speak formally and informally on topics in their specialty. Fine points of syntax, usage, and style will be discussed.

**651–652 Comparative Slavic Linguistics**

651, fall; 652, spring 4 credits each term. Prerequisites: for Russian 651, Russian 601 taken previously or simultaneously or permission of instructor; for Russian 652, Russian 651 or permission of instructor. Offered alternate years.

Hours to be arranged. E. W. Browne.

Sounds and forms of the Slavic languages and of prehistoric common Slavic; main historical developments leading to the modern languages.

**700 Seminar in Slavic Linguistics**

Offered according to demand. Variable credit. Staff.

Topics chosen according to the interests of staff and students.

**Literature**

**103 Freshman Writing Seminar: Classics of Russian Thought and Literature**

Fall or spring. 3 credits.

M W F 9:05. Staff.

Russia's literary tradition has always seen its literature as having a mission important to the development of the nation. In this course we will examine Russian literature as it participates in the debate, whether Russia? We will look in particular at the conflict between the Westernizers, those who thought Russia had its own unique destiny, and the Orientalists, who assumed a politically dissident stance. Among the authors read are Pushkin, Gogol, Turgeniev, Dostojevsky, Herzen, and Solzhenitsyn in English translation. The course will examine the rhetorical means each author uses to make his argument.

**104 Freshman Writing Seminar: Nineteenth-Century Russian Literary Masterpieces**

Fall or spring. 3 credits.

M W F 9:05 or 12:20. Staff.

This course will introduce students to a broad selection of the major works of the Russian literary tradition. Our emphasis will be on what makes each work interesting as writing, what themes have been particularly interesting to Russians, and how we recognize the distinctive voice of each of the writers we are studying. Among the authors read are Pushkin, Gogol, Turgeniev, Dostojevsky, Tostoy, and Chekhov. All reading is in English translation.

**105 Freshman Writing Seminar: Twentieth-Century Russian Literary Masterpieces**

Spring. 3 credits.

M W F 11:15. Staff.

Russian literature in the twentieth century has endured many ups and downs. At times it has produced great masterpieces of modern art. At times it has been forced into the dry mode of "socialist realism," in which it had to voice the ideas forced upon it by a totalitarian government. Russian authors have been glorified as the voice of the nation, and they have also perished in concentration camps in the far north of Siberia. In this course we will read a representative selection of these authors, including those who took the path of art, those who went to the "social command," and those who assumed a politically discursive stance. Among the authors read will be Babel, Pasternak, Olesha, and Solzhenitsyn. All reading in English translation.

**107 Freshman Writing Seminar: Writers on Writing**

Fall or spring. 3 credits.

T R 1:25–2:40. Staff.

Why do we write or read? The centrality of reading and writing in our lives evidences our dependence on language. Both processes paradoxically mirror and create reality. We will examine how writers of nineteenth- and twentieth-century Russian literature from Gogol to Olesha portray reading and writing processes in their works and, with the help of selections from Schiller, Poulet, Sartre, and others, we will analyze how and why we read and write.

**201–202 Readings in Russian Literature**

201, fall; 202, spring. 3 credits each term. Prerequisite: qualification in Russian. Open to freshmen. Formal requirements: daily homework sheets, occasional quizzes on vocabulary with questions on the texts in Russian and English, a final exam, and one semester paper (10–12 pages) to be written in English on a topic of the student's choice.

M W F 10:10 or 12:20. Staff.

Designed as the first literature course taken entirely in Russian—both readings and class discussions. But daily assignments are short and considerable guidance is provided; there is no presumption of fluency. The goals of the course are to introduce students to major genres (lyric poetry, fairy tale, drama, narrative prose); to sample widely differing literary styles, and to accomplish both without recourse to English in class. Readings from the nineteenth-century
matters: Pushkin, Gogol, Tolstoy, Dostoevsky, supplemented by twentieth-century poetry. Whenever possible, novels and short stories are read in "transposed" form—first the original, then an illustrated film strip, poetic reading, musical setting, or excerpt from an opera libretto (Mussorgsky's Boris Godunov, Rimsky-Korsakov's Tsar Saltan, Prokofiev's War and Peace).

307 Themes from Russian Culture Fall. 4 credits. Requirements: same as for Russian 306.
M W F 1:25. Staff.
Russia is a difficult culture to understand because it has been, at least until the twentieth century, two cultures: a Westernized elite and a vast, conservative Orthodox peasantry. The rift between what was "natively Russian" and what was borrowed from the West created for the educated classes a major crisis in identity. Where did Russia belong? It was a borderline culture, both East and West, and one reaction to that insecurity was to distrust or parody both sides of the border. Many of the greatest works of Russian culture are products of an attempt to bring these cultures together: nationalism and Orthodoxy in literature, Mussorgsky in music, Repin in visual art. This course begins by sampling the traditional aspects of Russian culture—folktales, early chronicles, lives of the saints, and Byzantium and its influence (such as the "church chant"). We then consider the transition to more Westernized forms, beginning in the eighteenth century, and the crisis this provoked. Subsequent readings are organized around three recurrent themes: the experience of the city (Petersburg), the displaced intellectual (Russia's "superfluous men"), and the search for meaningful biography—which is linked on a larger scale, with Russia's search for an identity in history. The basic texts are literary works of moderate length (no huge novels). Discussions are occasionally illustrated with slide shows and music. Class participation is crucial.

308 Themes from Russian Culture Spring. 4 credits. No prerequisites. Requirements: regular attendance and class participation, two in-class midterms; one semester paper, which may be rewritten in place of a take-home final exam. Not offered 1987-88.
M W F 1:25. Staff.
The major theme is literary realism: How have Russian and Soviet writers, in the last one hundred years, attempted to tell the truth through art? Readings by Tolstoy (nineteenth-century critical realism), Chekhov, Babel, Olesha, Zamyatin, Bulgakov (fantastic realism), Sholokhov and Gladkov (socialist realism), and Solzhenitsyn. Supporting themes include the liberating (and later enslaving) effect of the Revolution, the politicization of Russian literature, and various competing theories of realism as a mode of art. Background lectures in social and political history provided.

314 Intellectual Background of Russian Literature, 1825-1930 Not offered 1987-88.

Introductory interdisciplinary survey of Poland, Hungary, Czechoslovakia, and Yugoslavia since World War II, with emphasis on contemporary developments. The goals of the course are to examine differences among East European countries as well as common elements.

Interdisciplinary survey of the U.S.S.R. since the Revolution, with emphasis on contemporary developments.

331 Russian Poetry Fall. 4 credits. Prerequisites: Russian 202 or equivalent, and permission of the instructor. This course focuses towards the 12 credits of Russian literature in the original language for the Russian major. Also open to graduate students.
A survey of Russian poetry with primary emphasis on analysis of individual poems by major poets.

332 Russian Theatre and Drama Not offered 1987-88.

334 The Russian Short Story Not offered 1987-88.

335 Gogol Spring. 4 credits. There may be a special section for students who read Russian; if they are Russian majors, they may count this course as one in the original language. Also open to graduate students.
M W 2:30-3:45. Staff.
Selected works of Gogol read closely and viewed in relation to his life and to the literature of his time. Readings in English translation.

350 Tolstoy and the Disciplines (also College Scholar 350) Not offered 1987-88.

367 The Russian Novel (also Comparative Literature 367) Fall. 4 credits. Also open to graduate students. Special disc for students who read Russian. T R 9:05 plus 1 hour to be arranged G. Gibian. Recent Russian fiction in the context of the major Russian prose writers of the nineteenth and twentieth centuries.
M W 2:30-4:30 plus one hour to be arranged. Staff.
Selected works of Russian literature, 1917 to date, examined primarily as works of art, with some attention to their social, political, and historical importance. Mayakovsky, Babel, Pasternak, Solzhenitsyn, and others. Special attention to the Soviet period.

368 Soviet Literature Spring. 4 credits. Also open to graduate students. There will be a special section for students who read Russian. Not offered 1987-88. M W 11:15 plus one hour to be arranged. M. Scammell.
Selected works of Russian literature, 1917 to date, examined primarily as works of art, with some attention to their social, political, and historical importance. Mayakovsky, Babel, Pasternak, Solzhenitsyn, and others. In English translation.

369 Dostoevsky (also Comparative Literature 369) Fall. 4 credits. Not offered 1987-88.

The literature of the "third emigration." A survey of recent Russian literature by writers who have voluntarily or involuntarily left the Soviet Union during the past fifteen years. Among the authors discussed will be Solzhenitsyn, Sinyavsky, Brodsky, Zinoviev, Sokolov, Aksyonov, Vonovich, Limonov, Maximov, Aleshkovsky, Dovlatov, and Garbanevskaya. Some consideration will be given to the influences of émigré publishing houses and literary magazines on the development of contemporary Russian literature and literary and political issues being debated by émigré literary circles.

373 Chekhov Fall. 4 credits. A special section is offered for students who read Russian. Not offered 1987-88.
Reading and discussion of Chekhov's works, with emphasis on the short story. The course is designed for non-specialists as well as literature majors. A variety of approaches will be employed: informal lectures and discussions.

375 Literature of the Soviet Period, 1917-45 Fall. 4 credits. Prerequisite: permission of instructor. Also open to graduate students. Russian majors may do part or all of the reading in Russian by prior agreement with the instructor.
A survey of the development of Russian literature during the second quarter of the twentieth century, with the emphasis on attempts to create a purely Soviet literature but also taking into account the achievements of non-Soviet writers, including émigré and the so-called fellow travelers.

376 Literature of the Soviet Period, 1945-85 Spring. 4 credits. Prerequisite: permission of instructor. Also open to graduate students. Russian majors may do part or all of the reading in Russian by prior agreement with the instructor.
A survey of the development of Soviet literature after World War II, including the thaw, the literature of the Gulag, the rise of the dissident movement, and the creation of the "third emigration.

379 The Russian Connection (also Comparative Literature 379) Spring. 4 credits. Not offered 1987-88.
M W F 10:10. P. Carden.
We will examine the development of a Russian psychological literature of the interior self in its interrelationship with European literature. Using early examples—Flaubert, Beckett, Dostoevsky— we will explore the connection to Russian prose of the romantic period in Pushkin's Queen of Spades and Lessing's Hero of the Hour. We will compare Hoffmann's and Gogol's employment of the fantastic to probe the more obscure sides of the psyche. After reading Stendhal's Charterhouse of Parma, we will turn to two of the most significant psychological novels of the Russian tradition, Tolstoy's War and Peace and Dostoevsky's The Idiot. All reading is in English translation.

380 Soviet Dissident Literature Fall. 4 credits. Not offered 1987-88.
Study of the dissident literature, both before and after. Defining the meaning of the term, political dissidence and cultural and literary dissidence, and the religious dissident movement. The writings of Siningavsky-Tertz, Pasternak's Doctor Zhivago, and other figures of the past two generations. This course is intended for students of government and society in general, not only for students of Russian literature.

M W 2:30-4:30, plus one hour to be arranged. P. Carden and guest lecturers.
Education is a central theme in our cultural tradition. What makes a person educated? Should a child be shaped to benefit society or to benefit some notion of his own good? What makes a good teacher? Should we have schools and, if so, what kind? What role should the state play in determining what to teach and how it should be taught? These questions are fundamental to our philosophical discourse from Plato to Rousseau. Fiction takes school and learning as primary subjects, and narrative has developed under the influence of the pedagogical discourse; public policy is shaped by the debate over teaching and learning. Writing shapes education, both as a vehicle of pedagogical discourse and as a necessary practice at every level of education. These topics will be the focus of our discussion as we look at a number of texts from the philosophical, literary, and public policy discourse.

388 Ideas and Form in Novels of Social Inquiry (also Comparative Literature 388) Spring. 4 credits. Not offered 1987-88.
M W F 9:05. G. Gibian.
From the French Revolution to the present. Problems of relations between politics and the writer. Literary representations of conflict between political ideologies (ideas of revolution, justice, nationalism) and private needs (art, nature, love, order). Marx, Flaubert, Dostoevsky, Conrad, Trollope, Lenin, critical theorists, N. Saipaul, Richard Wright, Solzhenitsyn, Kundera, and others. Some poetry will also be included.

389 The Success of the Soviet Period, 1945-85 Fall. 4 credits. Prerequisite: permission of instructor. Also open to graduate students. Russian majors may do part or all of the reading in Russian by prior agreement with the instructor.
Comparative Literature 389) Czechoslovakia, and Yugoslavia (also Comparative Literature 390) Fall. 4 credits.

The course will deal with various aspects of the general subject of national identity and feeling. In addition to studying the political phenomenon of nationalism, we will also study the roles played by national awareness in the perception of one's identity, the self-imagery of national character, stereotypes of national and ethnic qualities, and the relation between a sense of belonging to a nation and various other groups. Case studies of several nations and ethnic groups. There will be guest lecturers.

Honors Essay Tutorial Fall or spring. 4 credits. Hours to be arranged. Staff.

[400 Reading the Great Tradition Fall. 4 credits. Prerequisites: Russian 202 or equivalent. Recommended: a course at the 300 or 400 level in which reading has been done in Russian. This course may be counted towards the 12 credits of Russian literature in the original language required for the Russian major. Not offered 1987–88.]

The course is designed to improve the reading facility of advanced undergraduates and beginning graduate students by reading selected works of Russian literature in the original and paying close attention to their stylistic qualities. Works of contemporary Russian authors, both those officially approved and disdained, those in the Soviet Union and those in emigration, will be read.

Russian Writing and the Nineteenth-Century Novel (also Comparative Literature 418) Fall. 4 credits. Not offered 1987–88.

M 2:30–4:30, P. Carden. Platonov thought affiliates basic philosophical questions to pedagogy. How do we know? How do we learn? What education will produce worthy citizens and teachers? We will turn to several novels of the nineteenth century, among them Tolstoy's War and Peace, Dostoevsky's Notes from Underground, and Flaubert's Salammbô. We will examine the principles of a pedagogy designed to encompass the whole of life, as it is set forth in such works of Plato as Meno, Phaedo, Symposium, and Republic and as it is reintroduced into the mainstream of philosophical thought by Rousseau's Émile and Schiller's Letters on Aesthetic Education. Then we will trace the developments of pedagogy in Russian literature, concentrating in particular on the novels. Knowledge of Russian is highly desirable, but all the works discussed also exist in English translation.

Pushkin Spring 4 credits. Prerequisites: Russian 202 or equivalent, and permission of instructor. This course may be counted towards the 12 credits of Russian literature in the original language for the Russian major. Also open to graduate students. Not offered 1987–88.

T 12:20–1:15, S. Senderovich. Reading in the original language and discussion of selected works by Pushkin: lyrics, narrative poems, and Eugene Onegin.

Reading in Russian Literature Fall or spring. 1–4 credits each term. Prerequisite: permission of instructor. To be arranged. Staff.

This course is to be taken in conjunction with any Russian literature course in English translation. Students will receive one credit for reading and discussing works in Russian in addition to their normal course work.

Supervised Reading in Russian Literature Fall or spring. 1–4 credits each term. Hours to be arranged. Staff.


Graduate Seminars

Supervised Reading and Research Fall or spring. 2–4 credits. Prerequisite: permission of the department. Hours to be arranged. Staff.


T 4–6, S. Senderovich. Selected topics.


T 4–6, S. Senderovich. A survey.


T 4–6, S. Senderovich.


Russian Romanticism Fall. 4 credits. Taught in Russian. T 4–6, S. Senderovich. A survey of concepts, themes, genres, and main individual contributions in Russian literature of the Age of Romanticism.

Russian Realism Fall. 4 credits. Open to advanced undergraduates with permission of instructor. Not offered 1987–88.

R 3:35–5:35, P. Carden. A study of the development of the realistic movement in Russian prose fiction, with some attention to the poetic tradition. In addition to reading representative works, we will pay attention to the historical background of the period. We will approach the works through the critical writings of several important theorists, in particular those of Lydka Ginzburg.

Bakhtin and the Russian Formalists (also Comparative Literature 670) Spring. 4 credits. Open to advanced undergraduates with permission of instructor. All readings in English. Not offered 1987–88.

W 3:35–5:35, C. Emerson. The Russian literary theorist Mikhail Bakhtin has become, in the past several years, an important new presence in Western criticism. Bakhtin's work on Dostoevsky, Rabelais, Goethe, the history of the novel, and the philosophy of language has proved remarkably translatable into other cultures and disciplines. This course will consider the Bakhtin legacy in the light of its originating context, the Soviet 1920s, and focus on the polemical dialogue Bakhtin pursued with major intellectual currents of his time: Marxist, formalist, Freudian, socialist-realist. The usefulness of Bakhtin's methods and categories for Western criticism will then be contrasted with Bakhtin's curious fate in the Soviet Union as cult figure, claimed by both Stalinists and neconservatives and contemporary semioticians.

Graduate Seminar Fall. 4 credits. Also open to advanced undergraduates. Not offered 1987–88.

W 3:35–5:35, C. Emerson. Topic: intellectual foundations of nineteenth-century Russian literature. The course will investigate, in a roughly chronological frame, the major institutionalizations and philosophical currents that both shaped nineteenth-century writers and were shaped by them. Readings include fiction proper, journalism, ideological tracts, and critical and theoretical essays by such figures as Radishchev, Kholmakov, Chaadaev, Dobrolyubov, Chernyshevsky, Herzen, Grigoriev, Strakhov, the Stasov brothers, and the polemical essays of Dostoevsky and Tolstoy. Secondary readings will examine the development of pedagogical thought and practice in the U.S.R., and in the West by Jeffrey Brooks and William Mills Todd. The course aims to provide students with a pedagogical context for placing nineteenth-century literature in the context of its own social history. While building on the basic information available from a Russian history course, it emphasizes the literary aspects of ideology and the interaction between artistic expression and the social deed.


M 2:30–4:30, M. Scammell. Vladimir Nabokov wrote much verse, several plays, numerous short stories, and nine novels in Russian before switching to English. He is a major Russian writer of the twentieth century. This seminar will examine his work in the context of modern Russian literature, concentrating in particular on the novels. Knowledge of Russian is highly desirable, but all the works discussed also exist in English translation.


Graduate Seminar: Neglected Masterpieces of Short Russian Prose Spring. 4 credits. R 3:35–5:35, G. Gibian. Nineteenth- and twentieth-century works chosen according to the needs of the students enrolled. Stress on skills useful in teaching Russian literature.
Sanskrit
See Linguistics 641–642.

Serbo-Croatian

[131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Serbo-Croatian 132: Serbo-Croatian 131 or equivalent. Offered alternate years. Not offered 1987–88. Hours to be arranged. E. W. Browne.]

133–134 Continuing Course 133, fall; 134, spring. 3 credits each term. Prerequisites: for Serbo-Croatian 133, Serbo-Croatian 132 or equivalent; for Serbo-Croatian 134, Serbo-Croatian 133 or equivalent. Offered alternate years according to demand. Hours to be arranged. E. W. Browne.

Sinhala (Sinhalese)

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Sinhala 102: Sinhala 101 or equivalent. Hours to be arranged. J. W. Gair and staff. A semi-intensive course for beginners. A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

201–202 Sinhala Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Sinhala 201, qualification in Sinhala; for Sinhala 202, Sinhala 201 or equivalent. Hours to be arranged. J. W. Gair and staff.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Sinhala 203, Sinhala 202 or permission of instructor; for Sinhala 204, Sinhala 203 or equivalent. Hours to be arranged. J. W. Gair and staff.

Related Courses
See also Linguistics 341, 442, 631, 640, 641.

Spanish


The Major
The major is designed to give students proficiency in the oral and written language, to acquaint them with Hispanic culture, and to develop their skill in literary and linguistic analysis. Satisfactory completion of the major should enable students to meet language and linguistic requirements for teaching. To continue with graduate work in Spanish or other appropriate disciplines, or to satisfy standards for acceptance into the training programs of the government, social agencies, and business concerns. A Spanish major combined with another discipline may also allow a student to undertake preprofessional training for graduate study in law or medicine. Students interested in a Spanish major are encouraged to seek faculty advice as early as possible. For acceptance into the major, students should consult one of the directors of undergraduate studies in Spanish—Professor Vernon, for literature (273 Goldwin Smith Hall), or Professor Sufer for language and linguistics (218 Morrill Hall)—who will admit them to the major, and choose an adviser from the Spanish faculty of either the Department of Romance Studies or the Department of Modern Languages and Linguistics. Spanish majors will then work out a plan of study in consultation with their advisers. Previous training and interests as well as vocational goals will be taken into account when the student's program of courses is determined.

Spanish 201 and 204 or 212 (or equivalent) are prerequisite to entering the major in Spanish. All majors will normally include the following core courses in their programs:

1. two literature courses of the 315–316–317 series
2. 311 and 312 (or equivalent) Spanish majors have great flexibility in devising their programs of study and areas of concentration. Some typical options of the major are:

1) Spanish literature, for which the program of study normally includes at least 24 credits of Spanish literature beyond the core courses. Literature majors are strongly urged to include in their programs courses in all the major periods of Hispanic literature.

2) Spanish linguistics, for which the program normally includes 366, 401, 407, 408, and at least 18 additional credits in general or Spanish linguistics. (Linguistics 101–102 are recommended before entering this program.) Students interested in including linguistics in their programs should consult with the director of undergraduate studies for the Department of Modern Languages and Linguistics (Professor M. Sufer).

3) A combination of literature and linguistics.

4) Any of the above, taken in any combination, but with certain courses counted towards the major. Whichever option a student chooses, he or she is encouraged to enrich the major program by including a variety of courses from related fields or by combining Spanish with related fields such as history, philosophy, sociology, anthropology, art, music, Classics, English, comparative literature, and other foreign languages and literatures. In particular the interdepartmental programs in Latin American Studies and Hispanic Studies sponsor relevant courses in a variety of areas.

Spanish majors are encouraged to spend all or part of the junior year in a Spanish-speaking country. Cornell runs its own program in Seville. Students interested in the Study Abroad Program should consult with the Academic Advising Center for further information. The J. G. White Prize and Scholarships are available annually to students who achieve excellence in Spanish.

Honors. Honors in Spanish may be achieved by superior students who want to undertake guided independent reading and research in an area of their choice. Students who complete two undergraduate years with a major in the Spanish faculty from either the Department of Romance Studies or the Department of Modern Languages and Linguistics to supervise their work and direct the writing of their honors essays (see Spanish 429–430).

Fees. Depending on the course, a small fee may be charged for copies of texts for course work.

Language and Linguistics

121–122 Elementary Course 121, fall; 122, spring. 4 credits each term. Prerequisite for Spanish 122: Spanish 121. Special sections of this course are available for students with qualification in another language. Intended for beginners or students placed by examination. Students who obtain a CPT achievement score of 560 after Spanish 121–122 attain qualification and may enter the 200-level sequence; otherwise Spanish 223 is required for qualification. Lecture. Fall: M W F 9:05, 10:15, 11:15, 12:20, 1:25, 2:30, or 3:35. Evening prelims: fall, 7:30 p.m., Oct. 7; spring, 7:30 p.m., March 8, April 28. J. N6methy.

A thorough grounding is given in all language skills: listening, speaking, reading, and writing. Language practice is in small groups. Lecture covers grammar, reading, and cultural information.

123 Continuing Spanish Fall, spring, or summer. 4 credits. Limited to students who have previously studied Spanish and have a CPT achievement score between 450 and 559. Satisfactory completion of Spanish 123 fulfills the qualification portion of the language requirement.

Fall: lec, M 11:15 or 1:25, drills, T–F 8, 9:05, 10:10, 11:15, 12:20, 1:25, or 2:30; Spring: lec, M 11:15 or 1:25; drills, T–F 9:05, 10:10, 11:15, or 12:20. Evening prelims: fall, 7:30 p.m., Oct. 6, Nov. 10; spring, 7:30 p.m., March 1, April 15. J. Routier.

An all-skills course designed to prepare students for study at the 200-level.

123.7 Special section of Spanish for business communication Fall. Prerequisite: permission of instructor. T–F 1:25. J. Routier.

Same as Spanish 123 but with emphasis on business communication.

Note: Students placed in the 200-level courses have the option of taking language and/or literature courses; see the listing under Spanish 201 for a description of the literature course that may be taken concurrently with the 203–204 or 211–212 language courses described below.

203 Intermediate Composition and Conversation Fall, spring or summer. 3 credits. Prerequisite: qualification in Spanish.


Conversational grammar review with special attention to the development of accurate and idiomatic oral expression. Includes readings in contemporary Spanish prose and practice in writing.

Special section for medical and health professions Prerequisite: permission of instructor.


Special section for hotel Spanish (see Hotel Administration 267). Spring. Prerequisite: permission of instructor.

M. W. F. hours to be arranged. E. Dozier.

Spanish 203 with emphasis on vocabulary related to the hospitality industry.

204 Intermediate Composition and Conversation Fall or spring. 3 credits. Prerequisite: Spanish 203 or permission of instructor.

Fall: M W F 8, 9:05, 10:10, 11:15, 12:20, 1:25, or 1:25. Spring: M W F 9:05, 10:10, 11:15, 12:20, or 1:25. Z. Iguna.

Practice in conversation with emphasis on improving oral and written command of Spanish. Includes treatment of specific problems in grammar, expository writing, and readings in contemporary prose.


311 Advanced Composition and Conversation Fall. 4 credits. Prerequisite: Spanish 204 or 212, or equivalent.


Advanced language skills, developed through reading, grammar review, and intensive practice in speaking, writing, and translation. Analysis of present-day Spanish usage in a wide variety of oral and written texts.
who exemplify different theoretical points of view. 


According to demand. Variable credit.

[604 Contemporary Theories of Spanish Dialects of the Iberian Peninsula, studied in relation to Galician, Portuguese, Sephardic) and of the main characteristics of the Romance languages (Catalan, Spanish, French, Italian) and their relation to each other and to Castilian Spanish.] 


603 Contemporary Theories of Spanish Phonology Fall or spring, according to demand. 4 credits. Not offered 1987-88. Hours to be arranged. Staff. 

The sounds of Spanish analyzed according to Prague, structuralist, generative, and natural generative theory.

604 Contemporary Theories of Spanish Grammar Fall or spring, according to demand. 4 credits. Not offered 1987-88. Hours to be arranged. Staff. 

Selected readings of contemporary Spanish linguists who exemplify different theoretical points of view.

700 Seminar in Spanish Linguistics Fall or spring, according to demand. Variable credit. Hours to be arranged. Staff. 

Topics in synchronic and diachronic Spanish linguistics.

Literature

105 Freshman Writing Seminar: Paradise Lost: Biculturalism in America Fall. 3 credits. 


We will dissect the myth of the American Dream through a study of literature written by American ethnic minority authors. Topics of discussion will include how expectations clash or coincide with reality and what mechanisms evolve in order to maintain biculturality in our predominantly Anglo society. We will read representative semifictional works such as Raymond Barrio’s The Plum Plum Pickers, Maxine Hong Kingston’s China Men, Scott Momaday’s House Made of Dawn, and Piri Thomas’ Down These Mean Streets, and we will screen the movie El norte. Written work will involve short analytic papers on the readings. An effort will be made to respond to the special compositional needs of bicultural students.

[106 Freshman Writing Seminar: Searching for Self in Hispanic Fiction 3 credits. Not offered 1987--88.] 

109 Freshman Writing Seminar: Revolution and Literature in Latin America Fall. 3 credits. 

T R 8:40--9:55. Staff. 

The Mexican Revolution of 1910 and the Cuban Revolution of 1959 will serve as models for understanding current conflicts in Latin America. On the basis of our readings of such writers as Octavio Paz, Mariano Azuela, Carlos Fuentes, and Omar Cabezás (among others), we will consider historical, political, institutional, and economic— as well as literary—matters. Several of the particular questions we will address are foreign intervention, liberation theology, and the value and place of literature in revolutions.

110 Freshman Writing Seminar—Invented Reality: The Media and Central America Spring. 3 credits. 

T R 8:40--9:55. C. Mentley. 

If we examine mass media, alternative press, and nonjournalistic accounts of the current situation in Central America, we find that mainstream North American reporting is neither accurate nor unbiased. Yet even if the media stories were perfectly accurate, they still could not provide a complete depiction of Central American reality. To achieve this, we must have recourse to more than just “the facts.” Students in this seminar will first examine newspaper stories, magazine articles, fiction. They will then analyze, imitate, and manipulate the styles of these accounts. These varied reading and writing assignments, along with class discussions, will allow students to begin to understand Central America today, at the same time that they learn more about the inner workings of North American society.

125 Freshman Writing Seminar: The City in Hispanic Novels Spring. 3 credits. 


The recent boom in Hispanic fiction has frequently been accompanied by a shift in focus from rural to urban concerns. We will tour several representative Hispanic cities— New York, Mexico City, Havana, Buenos Aires—through careful reading (in English translation) of novels by such authors as Carlos Fuentes, G. Cabrera Infante, Manuel Puig, Julio Cortazar, Omar Cabezas (among others), we will consider historical, political, institutional, and economic—in addition to literary—matters. Several of the particular questions we will address are foreign intervention, liberation theology, and the value and place of literature in revolutions.

Modern Languages, Literatures, and Linguistics 185


An intermediate reading course designed to improve reading, writing, speaking, and comprehension skills in Spanish through the reading and discussion of contemporary literary works of various genres (narrative prose, drama, poetry) from Spain and Spanish America. Emphasis is placed on the development of fluency in reading and of critical and analytical abilities. The cultural, sociological, and esthetic implications of texts by authors such as Borges, Cortazar, Fuentes, Garcia Márquez, Garcia Lorca, and Cela are considered.

313 Spanish Civilization Spring. 4 credits. 


An examination of various twentieth-century theories of Spanish culture. We will read essays and fiction by leading interpreters of Spanish culture, among them Menendez Pidal, Unamuno, Ortega y Gasset, Americo Castro, and Sanchez Albornoz. We will also read and discuss some earlier selections of Spanish fiction that contribute to our understanding of Spanish civilization, including some examples of the Romanero, El Abencerraje and the Brevisima relation de la destruccion de las Indias.

Note: Spanish 315, 316, and 317 can be taken in any order.

315 Readings in Sixteenth- and Seventeenth-Century Hispanic Literature Spring. 4 credits. 

Prerequisite: Spanish 201 or 4 years of high school Spanish, or permission of instructor. This course is not a prerequisite for Spanish 316 or 317. 

T R 11:40--12:55. C. Arroyo. 

Readings and discussion of representative texts of the period from both Spain and her colonies in the New World: Garcilaso de la Vega, Lazarillo de Tormes, Sans Juan de la Cruz, Cervantes, Lope de Vega, Calderén, and others.

316 Readings in Modern Spanish Literature Fall. 4 credits. 

Prerequisite: Spanish 201 or 4 years of high school Spanish or permission of instructor. Taught in Spanish. 


Readings and discussion of representative texts from Spain from the romantic period to the present: Bécquer, Galdós, Unamuno, García Lorca, Cela, and others.

317 Readings in Spanish-American Literature Spring. 4 credits. 


Reading and discussion of representative texts of the nineteenth and twentieth centuries from Spanish America: Dario, Borges, Neruda, Paz, Cortázar, García Márquez, and others.

[322 Readings in Latin American Civilization 4 credits. Not offered 1987--88.] 

Note: The prerequisite for the following courses, unless otherwise indicated, is Spanish 315, 316, or 317, or permission of instructor.

[329 The Spanish Civil War in Literature and the Visual Arts (also Comparative Literature 329) 4 credits. Not offered 1987--88.] 

[332 The Modern Drama in Spanish America 4 credits. Not offered 1987--86.] 

[333 The Spanish-American Short Story 4 credits. Not offered 1987--88.] 

345 The Contemporary Spanish-American Novel Fall. 4 credits. 


Close readings of contemporary Spanish American narrative texts by representative authors such as Borges, Cabrera Infante, Carpenter, Cortázar, Fuentes,
[436 Hispanic Caribbean Culture and Literature 4 credits. Not offered 1987–88.]

351 Spanish Drama of the Golden Age Fall 4 credits. TR 10:10–11:25. C. Arroyo.
A reading of the comic plays from Juan del Encina through Calderón. Lope de Vega’s impact on the emergence of the comedy as the pervasive genre in Spanish literature between 1590 and 1640. Comedy and society and the sociology in the texts. Calderón, the idea of baroque. Theology and play; the theological axioms as the key signifiers for understanding the structures of the plays. The concept of baroque irony. Spanish matter according to the rules (scarron) in France.


[369 Archetypes of Spanish Literature 4 credits. Not offered 1987–88.]


390 Fiction of Modern Hispanic Women (also Women’s Studies 390) Fall 4 credits. Taught in Spanish.
This course will survey a representative sampler of novels and short stories by twentieth-century Hispanic women. We will be giving particular attention to the development of typical themes and subject matter relating to a female perspective on women’s experience as such concerns are illuminated by the context of recent feminist criticism. Readings will include works by Silvia Ocampo, Rosario FerrO, Susana Torres Molina, Carmen Martin Gaite, Carmen Gómez Ojea, Luisa Valenzuela, Cristina Peri Rossi, Mercedes Saisachs, and Albacía Angé.


[393 The Reader in the Novel (also Comparative Literature 389) 4 credits. Not offered 1987–88.]

This interdisciplinary course will consider various forms of politically charged art: works by writers such as Neruda and Cortázar; paintings by artists of the Mexican muralist movement; and fiction and documentary film. We shall attempt to characterize such art in an age whose aesthetic holds that art, at least good art, should be “pure.” We will examine the artistic techniques and the rhetoric of these works in contrast with those of “nonpolitical” works with an eye to exploring the boundaries between legitimate persuasion and propaganda. Third, we will contrast contemporary “self-conscious” political art with an earlier tradition of regionalism and social realism.


396 Modern United States–Hispanic Prose Fiction Spring. 4 credits. Taught in Spanish.
M W F 9:05. D. Castillo.
A detailed examination of representative twentieth-century fictional works (novels, short stories, plays) by Hispanic-American authors. Discussion will be centered on such issues as the social and political concerns raised by the fiction and the authors’ need to struggle with a double linguistic and cultural tradition. Authors include Nicholas Mohr, Piri Thomas, Rolando Hinoposa-Smith, Alejandro Morales, Tomás Rivera, Rivera Arias, Raymond Barrio, and Luis Valdez.

[397 Colombian Literature 4 credits. Not offered 1987–88.]

399 Spanish Film Fall. 4 credits. Taught in Spanish.
A course devoted to the appreciation and analysis of recent Spanish cinema. Beginning with the immediate postwar decade of the 1940s, we will focus on Spanish film as a narrative response to Spanish reality, both artistic (in the ilicit translation of other media, such as novel and ballet) and historical (in particular, the Spanish Civil War and its consequences). Films to be studied include works by the following directors: Buñuel, Saura, Franco, and Camus, among others.

415 The Black within: Hispanic Race and Literature (also Society for Humanities 415) Fall. 3 credits.
The Black presence, as conquerors and conquered, pervades Spanish culture. The process of internalization of blackness has been so controversial and thorough that most Hispanic texts disguise the Black pride or prejudice they endure. Afro-Hispanic "otherness" has come to be considered as a passive ally of the Hispanic "colonial self." Subversive Afro-Hispanic literature and literary characters, however, have transcended mere internalization and syncretic alliance. This seminar intends to trace the development of a subversive literary language of blackness from within the earliest peninsular literature through colonial and postcolonial Hispanic texts. Although readings will be in English, reading knowledge of Spanish will be helpful for the purpose of research.

419-420 Special Topics in Hispanic Literature 419. fall; 420. spring. 2–4 credits each term. Prerequisite: permission of instructor.
Spring. 4 credits. L. Trancik.
A reading of the major works of Unamuno, emphasizing the relationship between author, text, and reader: the function of parody and intertextual relations, and the mimetic vs. the reflexive modes.

421-420 Special Topics in Hispanic Literature 419. fall; 420. spring. 2–4 credits each term. Prerequisite: permission of instructor.
Spring. 4 credits. L. Trancik.
A reading of the major works of Unamuno, emphasizing the relationship between author, text, and reader: the function of parody and intertextual relations, and the mimetic vs. the reflexive modes.


A consideration of how the classical detective story has permeated the realm of "high," or "respectable," art, and, in particular, how some "serious" writers in Spanish America, such as Bly Casares, Borges, Fuentes, García Márquez, Leñero, Ocampo, Onetti, Puig, Sabato, and Vargas Llosa, have simultaneously recuperated and subverted the conventions of this "popular" genre. Topics for discussion will include the relationship between author, text, and reader; the function of parody and intertextual relations, and the mimetic vs. the reflexive modes.

497 Spanish Poetry and Poetics 4 credits. Not offered 1987–88.}

[499 Borges (also Comparative Literature 499) 4 credits. Not offered 1987–88.]

639–640 Special Topics in Hispanic Literature 639, fall; 640, spring. 4 credits each term. Staff.

[667 Seminar in Golden Age Literature 4 credits. Not offered 1987–88.]

The major Novelas contemporáneas of Benito Pérez Galdós, from Doña Perfecta through Fortunata y Jacinta to Misericordia, will be discussed from various critical perspectives, both as independent narrative constructs and as reflections of their historical circumstance.


694 Seminar in Modern Spanish Literature: Unamuno Spring. 4 credits. T 2:30–4:25. C. Arroyo.
A reading of the main works of Unamuno, emphasizing their impact on contemporary Spanish thought and their originality in literary theory.

Related Course in Another Department
Germans and Cultural Politics (German 685)

Swahili
See African Studies and Research Center.

Swedish

131–132 Elementary Course 131. fall; 132. spring. 3 credits each term. Prerequisite for Swedish 132, Swedish 131 or equivalent.
TR 8:30–9:45. L. Trancik.
The aim of this course is to develop skill in reading, although some attention will be devoted to speaking and listening comprehension.

133–134 Continuing Course 133. fall; 134. spring. 3 credits each term. Prerequisites: for Swedish 133, Swedish 132 or equivalent; for Swedish 134, Swedish 133 or equivalent.
Hours to be arranged. L. Trancik.
Continues developing skills in spoken and written Swedish.
Tagalog

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Offered according to demand. Prerequisite: permission of instructor. Prerequisite for Tagalog 102, Tagalog 101.

Hours to be arranged. J. U. Wolff.

201–202 Tagalog Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Tagalog 201, Tagalog 102 or equivalent; for Tagalog 202, Tagalog 201 or equivalent.

Hours to be arranged. J. U. Wolff.


Hours to be arranged. J. U. Wolff.]

Tamil

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Offered according to demand. Prerequisite for Tamil 102, Tamil 101 or equivalent. Hours to be arranged. J. W. Gair.

Telugu

[101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Telugu 102, Telugu 101 or equivalent. Not offered 1987–88.

Hours to be arranged. G. Kelley.]

[201–202 Telugu Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Telugu 201, qualification in Telugu; for Telugu 202, Telugu 201 or equivalent. Not offered 1987–88.

Hours to be arranged. G. Kelley.

See also Linguistics 341, 440.

Thai

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Thai 102, Thai 101 or equivalent. Intended for beginners or students placed by examination.

Hours to be arranged. G. Difftoth.

A thorough grounding is given in all the language skills: listening, speaking, reading, and writing.

201–202 Thai Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Thai 201, qualification in Thai; for Thai 202, Thai 201 or equivalent.

Hours to be arranged. G. Difftoth.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Thai 201, qualification in Thai; for Thai 204, Thai 203 or equivalent.

Hours to be arranged. G. Difftoth.

Vietnamese

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Vietnamese 102, Vietnamese 101 or equivalent. Intended for beginners or students placed by examination.

Hours to be arranged. G. Difftoth.

201–202 Vietnamese Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Vietnamese 201, qualification in Vietnamese; for Vietnamese 202, Vietnamese 201.

Hours to be arranged. G. Difftoth.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Vietnamese 203, qualification in Vietnamese; for Vietnamese 204, Vietnamese 203.

Hours to be arranged. G. Difftoth.

301–302 Advanced Vietnamese 301, fall; 302, spring. 4 credits each term. Prerequisite: Vietnamese 201–202 or equivalent.

Hours to be arranged. G. Difftoth.

401–402 Directed Individual Study 401, fall; 402, spring. 4 credits each term. Prerequisite: permission of instructor. Intended for advanced students.

Hours to be arranged. G. Difftoth.

403–404 Vietnamese Literature 403, fall; 404, spring. 4 credits each term. Prerequisite: Vietnamese 302 or permission of instructor.

Hours to be arranged. G. Difftoth.

A historical survey of Vietnamese literature, including poetry, prose, and drama. Lectures in Vietnamese supplemented by selected readings in original texts. Fall: modern literature (1907–1975); spring: classical literature (beginning to late nineteenth century), including oral and nôm literature.

Yiddish

See listings under Near Eastern Studies.

Music

T. Sokol, chairman; M. Hatch, director of undergraduate studies (820 Lincoln Hall, 255-5049); D. Randel, graduate faculty representative (211 Lincoln Hall, 255-5059); W. Austin, M. Bilson, D. Borden, L. Coral, M. Gilman, A. Hamme, R. Harris-Warrick, C. Heth, J. Hsu, K. Husa, J. Lindorff, S. Monosoff, E. Murray, R. Parker, D. Paterson, J. Shames, M. Stith, S. Stucky, J. Webster, S. Davenny Wyner, P. Yampolsky, N. Zeislaw

Music 101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Vietnamese 102, Vietnamese 101 or equivalent. Intended for beginners or students placed by examination.

Hours to be arranged. J. H. Babby.

Ukrainian

[131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Prerequisite for Ukrainian 132, Ukrainian 131 or equivalent. Not offered 1987–88.

Hours to be arranged. E. W. Browne.]

Vietnamese

101–102 Elementary Course 101, fall; 102, spring. 6 credits each term. Prerequisite for Vietnamese 102, Vietnamese 101 or equivalent. Intended for beginners or students placed by examination.

Hours to be arranged. G. Difftoth.

201–202 Vietnamese Reading 201, fall; 202, spring. 3 credits each term. Prerequisites: for Vietnamese 201, qualification in Vietnamese; for Vietnamese 202, Vietnamese 201.

Hours to be arranged. G. Difftoth.

203–204 Composition and Conversation 203, fall; 204, spring. 3 credits each term. Prerequisites: for Vietnamese 203, qualification in Vietnamese; for Vietnamese 204, Vietnamese 203.

Hours to be arranged. G. Difftoth.

301–302 Advanced Vietnamese 301, fall; 302, spring. 4 credits each term. Prerequisite: Vietnamese 201–202 or equivalent.

Hours to be arranged. G. Difftoth.

401–402 Directed Individual Study 401, fall; 402, spring. 4 credits each term. Prerequisite: permission of instructor. Intended for advanced students.

Hours to be arranged. G. Difftoth.

403–404 Vietnamese Literature 403, fall; 404, spring. 4 credits each term. Prerequisite: Vietnamese 302 or permission of instructor.

Hours to be arranged. G. Difftoth.

A historical survey of Vietnamese literature, including poetry, prose, and drama. Lectures in Vietnamese supplemented by selected readings in original texts. Fall: modern literature (1907–1975); spring: classical literature (beginning to late nineteenth century), including oral and nôm literature.

Yiddish

See listings under Near Eastern Studies.

Musical Performance and Concerts

Musical performance is an integral part of Cornell's cultural life and an essential part of its undergraduate academic programs in music. The department encourages music making through its offerings in individual instruction and through musical organizations and ensembles, that are directed and trained by members of the faculty. Students from all colleges and departments of the university join with music majors in all of these ensembles:

Cornell Symphony Orchestra
Cornell Chamber Orchestra
Cornell Chamber Ensemble
Cornell Symphonic Band
Cornell Wind Ensemble
Small wind and brass ensembles
Collegium Musicum
Cornell Gamelan Ensemble
Chamber music ensembles
Cornell Chorus
Cornell Glee Club
Chamber Singers
Sage Chapel Choir
Cornell Jazz Ensemble

Information about requirements, rehearsal hours, and conditions for academic credit can be found in the following listings for the Department of Music. Announcements of auditions are posted during registration each fall term and, where appropriate, each spring term as well.

The Department of Music and the Faculty Committee on Music sponsor nearly one hundred formal and informal concerts each year by Cornell's ensembles, faculty, and students and by distinguished visiting artists. A special feature is the annual Cornell Festival of Contemporary Music. The great majority of concerts are free and open to the public. Lectures and concerts are listed in special monthly posters and the usual campus media.

Nonmajors

In addition to its performing, instructional, and concert activities, the department offers numerous courses for nonmajors, many of which carry no prerequisites and presuppose no previous formal training in music. Consult the following course listings, and for further information apply to the department office, 125 Lincoln Hall (255-4097), or to the director of undergraduate studies, Professor Martin Hatch.

The Major

Two options are available to the student planning to major in music. Each carries the study of music to an advanced level through the integration of performance, music theory, and music history. Option I is a general course, not necessarily oriented toward eventual graduate or professional work in music. Option II is a more specialized and concentrated program, suitable for students who want to prepare for graduate or professional work in music.

All students contemplating a major in music under either option should arrange for placement examinations and advising in the department during the orientation period of the freshman year, or earlier if at all possible. Information is available from the director of undergraduate studies, Professor Martin Hatch, B-20 Lincoln Hall (255-5049), or from the chairman, Professor Thomas Sokol, 124 Lincoln Hall (255-3671).

All students are expected to have chosen an adviser from among the department faculty at the time of application for major status.

Option I presupposes some musical background before entering Cornell. Prerequisites for admission to the major are the satisfactory completion of Music 152, at the latest by the end of the sophomore year (the freshman year is preferable), with a final grade of C or better, including an average grade of C or better in all the musicianship components of Music 152 and failure in none of them; and the passing of a simple piano examination (details are available from the department office). Students must apply to the department for formal acceptance as a music major.

The requirements for the Bachelor of Arts degree with a major in music under Option I comprise the following:

1) in music theory:

Music 251–252, 351, and 352.
2) in music history:
   sixteen credits in courses numbered at the 300 level or above listed under Music History. At least two of these courses must be drawn from the three-course sequenceMusic 381–383.

3) in performance:
   four semesters of participation in a musical organization or ensemble sponsored by the Department of Music.

Option II presupposes considerable musical study before entering Cornell. Prerequisites for admission into the Option II program are previous acceptance as an Option I major, satisfactory completion of Music 252, normally by the end of the sophomore year. Students must apply to the department for formal acceptance as an Option II major. An Option II major concentrates on areas of specialization as a junior and senior. For Option II in performance, exceptional promise must be demonstrated, in part by a successful solo recital before the end of the sophomore year.

The requirements for the Bachelor of Arts degree with a major in music under Option II are:

1) completion of all the requirements for Option I, except as noted below, and

2) in addition:
   a) in performance:
      (1) the requirement for four semesters of participation in a musical organization or ensemble is satisfied if such major is expected to participate actively in chamber and other ensembles sponsored by the department;
      (2) sixteen credits in individual instruction in the student’s major instrument, or voice, earned by taking Music 391–392 throughout the junior and senior years.

   b) in theory and composition or in history:
      (1) for two of the four semesters of participation in a musical organization or ensemble, Music 462 or 463 may be substituted;
      (2) twelve additional credits in this area of concentration, of which 300 level or above, of which either four may be earned in Music 301 or 302 when taken once for four credits, or eight may be earned in Music 401–402.

Honors. The honors program in music is intended to provide special distinction for the department’s ablest undergraduate majors. To become a candidate for honors in music, a student must be invited by the faculty at the beginning of the second semester of the junior year. As soon as possible thereafter, the student will form a committee of three faculty members to guide and evaluate the student’s progress. In the senior year the candidate will enroll in Music 401–402, with the chairperson of the honors committee as instructor. Candidates will be encouraged to formulate programs that will allow them to demonstrate their total musical ability. The level of honors conferred will be based on the whole range of the independent work in this program, of which a major part will culminate in an honors thesis, composition, or recital to be presented not later than April 1 of the senior year, and a comprehensive examination to be held not later than May 1.

Distribution Requirement

The distribution requirement in the expressive arts may be satisfied with 6 credits in music, except freshman writing seminars. A maximum of 4 credits in Music 321–322 and a maximum of 3 credits in Music 331 through 338 and 441 through 450 may be used to satisfy this requirement.

Facilities

Music Library. The Music Library, in Lincoln Hall, has an excellent collection of the standard research tools. Its holdings consist of approximately ninety thousand books and scores and fifteen thousand records. Particularly noteworthy are the collections of opera scores, libretti, and recordings from all periods; twentieth-century scores and recordings; and the large microfilm collection of Renaissance sources, both theoretical and musical. In addition, the Department of Rare Books, in Olin Library, houses a collection of early printed books on music and musical manuscripts.

Musical Instruments. The Verne S. Swan collection of about thirty musical instruments is especially rich in old stringed instruments. A small Chalis harpsichord* and clavichord are available for practice; a Dowd harpsichord, a Hubbard harpsichord, and replicas of a Stein fortepiano and a Graf fortepiano are reserved for advanced students and concerts. Among the recital pianos available for use are Steinway and Mason & Hamlin concert grands and a Boesendorfer Imperial. There is an Aeolian-Skinner organ in Sage Chapel, a Schlicker organ at Barnes Hall, and a Hellmuth Wolff organ in Arabel Taylor Chapel. A complete Javanese gamelan is on permanent loan from the Metropolitan Museum of Art, New York City; other instruments from non-Western cultures are available. A studio for electronic music is housed in Lincoln Hall.

Freshman Seminars

111 Sound, Sense, and Ideas Fall or spring. 3 credits. Each section limited to 18 students. No prerequisites; students do not need to have studied music. May not be counted for the distribution requirement in the expressive arts.

   Ways of listening, thinking, talking, and writing about music. Non-Western and popular music are considered, as well as Western classical music. Student performances in class are welcome.

Introductory Courses

101 The Art of Music Fall or summer. 3 credits. T R 11:15–12:15; 1-hour disc to be arranged. W. Austin and staff.
   Explorations, chiefly through study of phonograph records, designed to speed up the continuing development of various independent tastes. Each student chooses individually what to study from among diverse styles of music; instructors help refine these choices through the term. Everyone studies a few assigned works, especially by J. S. Bach, Ludwig van Beethoven, and Ray Charles, to provide a common focus for tracing and discussing historical continuities and changes. Diversity is represented in the lectures by live performances as well as recordings. The lectures are organized by modality, rhythms, chords, and musical forms, suggesting ways to study any music—beyond the course as well as within it.

[103 Introduction to the Musics of the World Fall. 3 credits. No previous training in music is required. Not offered 1987–88.]

105–106 Introduction to Music Theory 105, fall or summer; 106, spring. 3 credits each term. Some familiarity with music is desirable. Prerequisite for Music 106: 105 with grade of B – or better. Music 106 is limited to 50 students.
   M W 9:05; 2 disc hours to be arranged. D. R. Randle.
   An elementary, self-contained introduction to music theory, emphasizing fundamental musical techniques, theoretical concepts, and their application. Music 105: ear training; notation, pitch, meter, intervals, scales, triads; basic concepts of tonality; extensive listening to music in various styles; analysis of representative works of Bach, Mozart, Beethoven, and Debussy. 106: systematic introduction to counterpoint; composition of four-part chorales or short keyboard pieces.

108 Bach to Debussy Spring. 3 credits. Prerequisite: Music 105 or permission of instructor. T R 10:10; 1-hour disc to be arranged. N. Chaslaw. A chronological survey of major works in the Western classical tradition, with emphasis on works of Bach and Handel that embody the newly consolidated language of tonality to works of Mahler and Debussy that signal the beginning of new strategies for many composers of the twentieth century.

117 The Organ and Its Literature Fall. 3 credits. Prerequisite: Music 105 or permission of instructor. M W F 11:15. D. R. M. Paterson.
   An analytical survey of the history of the organ, including its design and construction and its most significant repertoire.

120 Learning Music through Digital Technology Spring. 3 credits. Prerequisite: permission of instructor. M W F 2:30. D. Borden.
   This course uses selected commercially available technological resources to produce live music. The student is expected to master the Macintosh computer, several music software programs, and several synthesizers using MIDI. Each student must learn to read music if he or she has not already done so. The course will also cover the rudimentary procedures for making a good-quality tape recording. The final is a live concert presentation of the student’s final project.

Music Theory

151–152 Elementary Tonal Theory 151, fall; 152, spring. 5 credits each term. Prerequisite for Music 151: knowledge of the rudiments of music and some ability to perform demonstrated through proficiency tests given on the first two days of the term (registration is provisional, contingent on passing this test).
   Prerequisite for Music 152: 151 or equivalent. Intended for students expecting to major in music and other qualified students. Required for admission to the music major. All students intending to major in music, especially those intending to elect Option II, should if possible enroll in Music 151–152 during the freshman year.
   M W F 9:05; 2 discs to be arranged. S. Stucky and staff.
   Detailed study of the fundamental elements of tonal music; rhythm, scales, intervals, triads, melodic progression, two-part counterpoint, harmonic progression in the chorale style of J. S. Bach; and introduction to analysis of small forms. Drill in aural discrimination, sight singing, keyboard harmony, and elementary figured bass, rhythmic, melodic, and harmonic dictation, and score reading.

245–246 Introduction to the Gamelan 245, fall; 246, spring. 2 credits each term. Prerequisite: Music 101 or equivalent knowledge of musical notation or performance experience necessary. Music 245 is not a prerequisite to 246.
   M W 12:20 or R 3:30–5:30 plus one hour to be arranged. P. Yampolsky, M. Hatch.
   Concentrated instruction in the repertoires and practices of Indonesian gamelan traditions. Related aspects of culture—drama, dance, literature, and oral poetry—will be studied in their influence on musical practices. Research into performance styles and the history of the instruments. This sequence concentrates on instruction in elementary techniques of performance on the gamelan. The student is required to submit a short paper showing research on the history, theory, or practice of Indonesian music. Music 445–446 is a one-credit course for beginners in gamelan that meets at the same times as 245–246 and covers only instruction in elementary gamelan performance techniques.

251–252 Intermediate Tonal Theory 251, fall; 252, spring. 5 credits each term. Prerequisite for Music 251: 152 or the equivalent or a suitable level of performance on a proficiency test given by the department during orientation each fall term. Prerequisite for Music 252: 251.
   M W F 10:10; 2 discs to be arranged. J. Webster, R. Parker.
   Introduction to writing two- and three-part counterpoint in the style of J. S. Bach. Concentration of the study of harmony by composition and analysis, including seventh chords, secondary dominants, and chromatic harmony. Students are expected to write several short
forms, such as two-part inventions and minuets scored for string quartet. Continuation of analysis of forms, with emphasis on large forms, e.g., sonata form. Ear training, keyboard harmony, figured bass, sight singing, dictation, and score reading.

351 Advanced Tonal Theory Fall. 4 credits. Prerequisite: Music 252 or equivalent.
M W F 11: 5. W. Austin.
Inventions, chromatic harmony, analysis of larger forms and nineteenth-century music, ear training, score reading, and advanced keyboard studies, including figured bass.

352 Materials of Twentieth-Century Music Spring. 4 credits. Prerequisite: Music 351.
M W F 11:5. W. Austin.
Introduction to some techniques of composers from 1900 to 1950, including expanded tonal resources, atonality, and new approaches to form and rhythm. Analysis of representative smaller works by Bartok, Hindemith, Schoenberg, Stravinsky, Webern, and some American composers. Writing assignments in various styles.

[451 Counterpoint Spring. 4 credits. Prerequisite: Music 351 or equivalent. Not offered 1987–88.]

[452 Form and Analysis Spring. 4 credits. Prerequisite: Music 351 or equivalent. Not offered 1987–88.]

456 Orchestration Fall. 4 credits. Prerequisite: Music 256. T 10:12–12:05. K. Husa.
A study of the instruments of the orchestra and their use in representative works from 1700 to the present. Scoring for various instrumental groups, including large orchestra. Students will occasionally attend rehearsals of Cornell musical organizations and ensembles.

462 Orchestral Conducting Spring. 2 credits. Prerequisite: Music 352.
T 10:12–12:05. K. Husa.
The fundamentals of score reading and conducting technique, study of orchestral scores from baroque, classical, romantic, and contemporary periods. Occasionally the class will visit rehearsals of Cornell musical organizations.

463 Choral Conducting Spring. 2 credits. Prerequisite: Music 252 or permission of instructor. Not offered 1987–88.

[464 Choral Style Spring. 2 credits. Prerequisite: Music 252 or permission of instructor. Not offered 1987–88.
F 2:30–4:10. T. A. Sokol.]

Music History

T R 11:15; disc to be arranged. W. Austin, G. Gebian, and staff.

[219 Chopin, Chaliavski, Musorgski Spring. 1 credit. Prerequisite: reading knowledge of Russian. Limited to students concurrently enrolled in Music 218. Not offered in 1987–88.]
Sem to be arranged. See description for Music 218.

221 Popular Music Spring. 3 credits. No previous formal training in music is required. M W; to be arranged (two weeks prior to spring recess, then occasional review sessions). M. Hatch and staff.

222 Jazz Spring. 3 credits. No previous formal training in music is required. M W; to be arranged (two weeks prior to spring recess, then occasional review sessions). M. Hatch and staff.

Lectures will introduce various jazz styles and techniques from around 1900 to the 1970s. Sections will present progressive exercises in analysis of fundamental aspects of jazz, including rhythm, meter, melody, harmony, timbre, and form. Focus: the recorded antholgy Smithsonian Collection of Classical Jazz.

223 Music of the American Indian Fall. 3 credits. T R 1:25–2:40. T. R. Martin.
Study of American Indians will be within the broader context of styles, cultural values, and sources. Specific reference to the musics of Athabascans, Pueblo, and the plains areas will be emphasized along with modern Pan-Indian trends. Films, recordings, lectures, and limited group singing and dancing will relate the music to each of the cultures producing it.

272 Music and the Dance (also Theatre Arts 272) Spring. 3 credits. Prerequisite: permission of instructor.
T R 9:05. R. Harris-Warrick.
This course will explore selected topics in the interrelationships between music and dance in the Western tradition. Some of the areas to be examined include the influence of dance movement on musical composition, composer-choreographer relationships, and a comparison of music composed for dancing with dance music composed for listening. Examples will be drawn from the Renaissance, the baroque period, and the modern era. Students will be asked to pursue an independent project.

274 Opera Fall. 3 credits.
M W 11:15. A. Groos, R. Parker.
A team-taught introduction to major repertory works, with discussion of texts and theatrical performance as well as music. Operas surveyed will span the period from Mozart to modern times, with emphasis on works by Mozart, Verdi, and Wagner. Video recordings will be an integral part of the course; optional trips to live performances will be scheduled where possible. (See also Music 374 and German Literature 374.)

277 Baroque Instrumental Music Spring. 3 credits. Prerequisite: a previous course in music or permission of instructor.
M W F 12:15. N. Zaslaw.
Topics covered will include the rise of purely instrumental music; Renaissance string bands; the English virginalists and viols; the Italian violin school; the German organ school; lute, keyboard, and wind music; the invention of the baroque winds, orchestra, and fortepiano; and the sonatas, concertos, and suites of Bach, Corelli, Couperin, Handel, Purcell, Rameau, Telemann, and Vivaldi.

281 Music of the Baroque Period Fall or spring, every third semester. 3 credits. Prerequisite: any course in music or permission of instructor.
The history of music from the appearance of monody, opera, and the continuo around 1600 to the culmination of baroque style in the music of Bach, Handel, and their contemporaries. Emphasis on the music of Monteverdi, Schutz, Purcell, Bach, and Handel.

The history of music from the emergence of classical style in the mid-eighteenth century through its dissolution after 1815, its relations to new genres like symphony, string quartet, and piano sonata; and its effects on old genres such as opera, church music, and concerto. Emphasis on music of Haydn, Mozart, and Beethoven.

[283 Music of the Romantic Era Fall or spring, every third semester. 3 credits. Prerequisite: any 3- or 4-credit course in music, or permission of instructor. Not offered 1987–88.
M W 1:25. J. Webster.]

[287 Mozart Fall. Prerequisite: another course in music or permission of instructor. 3 credits. Not offered 1987–88.
T R 1:25–2:40. N. Zaslaw.]

[313 Music and Poetry in the Renaissance Spring. 4 credits. Prerequisite: any course in music or permission of instructor. Not offered 1987–88.

Debussy to the Present Fall. 4 credits. Prerequisite: Music 152 or permission of instructor. Not offered 1987–88.

Music and the Dance (also Theatre Arts 372) Spring. 4 credits. Prerequisite: permission of instructor.
This course will explore selected topics in the interrelations between music and dance in the Western tradition. Some of the areas to be examined include the influence of dance movement on musical composition, composer-choreographer relationships, and a comparison of music composed for dancing with dance music composed for listening. Examples will be drawn from the Renaissance, the baroque period, and the modern era. Students will be asked to pursue an independent project.

Music and Poetry in France: Late Middle Ages and Renaissance (also French 318) Spring. 4 credits. Prerequisite: permission of either instructor. This course will be of most interest to students who have done some work in music or in French literature. The ability to read music is not a prerequisite, but a reading knowledge of French is necessary. Graduate students who enroll in Music 673 will be given supplementary assignments.
Changing relations between vernacular poetry and secular music from the late fourteenth century to the early sixteenth century. Examples will include Guillaume de Machaut's settings of his own poems, the rondels and ballades set by Du Moy and Binchot, the increasingly varied forms cultivated by Joquin Desprez and his contemporaries, and settings of the strophic chansons and psalm translations of Marot.

374 Opera Fall. 4 credits. Prerequisite: Music 152 or equivalent.
M W F 12:15; plus 1 disc to be arranged. A. Groos, R. Parker.
The same as Music 274, but with one additional meeting a week devoted to technical discussion of individual works.

381 Music of the Baroque Era Fall or spring, every third semester. 4 credits. Prerequisite: Music 152 or equivalent.
The same as Music 281, but with one additional meeting a week devoted to technical discussion of individual works.

382 Music of the Classical Period Fall or spring, every third semester. 4 credits. Prerequisite: Music 152 or equivalent.
The same as Music 282, but with one hour each week devoted to technical discussion of individual works.

[383 Music of the Romantic Era Fall or spring, every third semester. 4 credits. Prerequisite: Music 152 or equivalent. Not offered 1987–88.
The same as Music 283, but with an additional hour each week devoted to technical discussion of individual works.]

[387 Mozart Fall. 4 credits. Prerequisite: Music 152 or permission of instructor. Not offered 1987–88.
For description see Music 261.]
Lessons for credit (Music 321–322): Advanced students, at the sole discretion of the instructor, may earn 2 credits each term for a one-hour lesson (or two half-hour lessons) weekly accompanied by an appropriate practice schedule. For every 4 credits earned in Music 321–322, the student must have earned, or currently be earning, at least 3 credits in Music courses (not including freshman writing seminars, Music 321–322; 331 through 338, 391–392, or 441 through 450); these 3 credits must be earned prior to, or simultaneously with, the first 2 credits in 321–322. The fee for a one-hour lesson (or two half-hour lessons) weekly, for credit, during the term is $135. Practice-room fees for twelve hours weekly are $33 per term for a room with a piano; $10 for a room without a piano; $6750 for use of a pipe organ. Fees are non-refundable once lessons begin, even if the course is subsequently dropped.

Music majors receive a scholarship equal to the lesson fee listed above. Members of department-sponsored performance ensembles and organizations may, with permission of the director of the organization, receive a scholarship of up to one-half the Cornell fee for the type of lessons chosen during the term. (These scholarships are intended for students in the primary performing medium.)

Under certain conditions students may earn credit for lessons taken outside Cornell (Music 321h–322h). Arrangements must be made through the Department of Music office. Lesson-fee scholarships apply, when awarded, in the same dollar amounts as those for lessons taken at Cornell.

321a–322a Individual Instruction in Voice
321a, fall; 322a, spring. 2 credits each term.
Hours to be arranged. S. Davenny Wyner.

321b–322b Individual Instruction in Organ
321b, fall; 322b, spring. 2 credits each term.
Hours to be arranged. D. R. M. Paterson.

321c–322c Individual Instruction in Piano
321c, fall; 322c, spring. 1–2 credits each term.
Hours to be arranged. M. Bilson, J. Shames, and staff.

321d–322d Individual Instruction in Harpsichord
321d, fall; 322d, spring. 2 credits each term.
Hours to be arranged. J. Lindorff.

321e–322e Individual Instruction in Violin or Viola
321e, fall; 322e, spring. 2 credits each term.
Hours to be arranged. S. Monosoff.

321f–322f Individual Instruction in Cello or Viola da Gamba
321f, fall; 322f, spring. 2 credits each term.
Hours to be arranged. J. Hsu.

321g–322g Individual Instruction in Brass
321g, fall; 322g, spring. 2 credits each term.
Hours to be arranged. M. Stith.

321h–322h Individual Instruction outside Cornell
321h, fall; 322h, spring. 2 credits each term.
Hours to be arranged. Staff.

All the standard orchestral and band instruments and guitar may, under certain conditions, be studied for credit with outside teachers. This course is available primarily for the study of instruments not taught at Cornell and for the use of those who for reasons of space cannot be admitted to Music 321a–g or 322a–g. Prior approval by a member of the faculty in the department is required. For information and a list of approved teachers, consult the department office, 125 Lincoln Hall.

391–392 Advanced Individual Instruction
391, fall; 392, spring. 4 credits each term. Open only to juniors and seniors majoring in music under Option II with concentration in performance and to graduate students. Option II majors whose lessons must be taken outside Cornell may apply to the department for financial assistance towards the cost of lessons; $135 per semester will normally be awarded to such students, and a larger amount may be awarded under certain circumstances. Music 391 is not a prerequisite to 392.

Hours to be arranged. Staff.

Musical Organizations and Ensembles
Students may participate in musical organizations and ensembles throughout the year. Permission of the instructor is required, and admission is by audition only, except that the Sage Chapel Choir and the Cornell Gamelan Ensemble are open to all students without prior audition. Registration is permitted in two of these courses simultaneously, and students may register in successive years, but no student may earn more than 6 credits in these courses. Membership in these musical organizations and ensembles is also open to qualified students who wish to participate without earning credit.

331–332 Sage Chapel Choir
331, fall or summer; 332, spring. 1 credit. No audition for admission. M. W. 7:30–8:30 p.m., R 7:30–8:30 p.m., Sunday 9:30 a.m. D. R. M. Paterson, W. Cowdry.

333–334 Cornell Chorus or Glee Club
333 fall; 334 spring. 1 credit. Prerequisite: permission of instructor. Chorus: T 7:15–9:15 p.m., plus 2 hours to be arranged. Glee Club: W 7:15–9:15 p.m., plus 2 hours to be arranged. S. Davenny Wyner or T. Sokol.

335–336 Cornell Orchestra
335, fall; 336, spring. 1 credit. Prerequisite: permission of instructor. Rehearsals for the Cornell Symphony Orchestra: W 7:30–10 p.m. J. Hsu, T. White.

337–338 University Bands
337 fall; 338, spring. 1 credit. Symphonic band: fall or spring, T and W 4:30–5:45. Wind ensemble: fall, M 7:30–9:30 p.m., spring, M 7:30–9:30 p.m. and R 4:30–5:45. M. Stith. Students interested in participating in the Big Red Marching Band may inquire at the Department of Athletics, Teagle Hall.

412–422 Cornell Chamber Ensemble
1 credit. Prerequisite: permission of instructor. R 5–6:30. J. Hsu.

Students interested in performing in the chamber symphonies of Haydn, Mozart, and their contemporaries. For strings, woodwinds, and horns.

441–442 Chamber Music Ensemble
441, fall; 442, spring. 1 credit. Prerequisite: permission of instructor. S. Monosoff. Study and performance of chamber music literature; string and wind groups; piano trios and quartets. Technical or 441 through 450. Fees are non-refundable once lessons begin, even if the course is subsequently dropped.

443–444 Chamber Singers
443, fall; 444, spring. 1 credit. Prerequisite: permission of instructor. Hours to be arranged. S. Davenny Wyner. Study and performance of selected vocal chamber music.

445–446 Performance on the Gamelan
445, fall; 446, spring. 1 credit each term.

M W 12:20 R or 3:30–5 (beginners); Cornell Gamelan Ensemble (advanced), R 7:30 p.m. plus one hour. M. Hatch, P. Yampolsky, and staff. Basic performance techniques and theories of central Javanese gamelan. Tape recordings or gamelan and elementary cypher notation are provided. Some instruction by Indonesian musicians is offered in most years.

447–448 Collegium Musicum
1 credit. Prerequisite: permission of instructor. Not offered 1987–88.

Graduate Courses

Open to qualified undergraduates with permission of instructor.

601 Introduction to Bibliography and Research
Fall. 4 credits.

[602 Analytical Technique]
R 1:30–4:25. J. Webster.
A critical survey of various analytical methods in current use. Frequent analytical assignments and class presentations.

603 Editorial Practice
Spring. 4 credits.
R 4:25. J. Webster.
Fundamental techniques of source study and filtration, the nature of a musical text, and the editorial process. Opportunity to make a critical edition based on original sources.

622 Historical Performance Practice
Spring. 4 credits.
Concentration on music for the harpsichord.

653 Topics in Tonal Theory and Analysis
Hours to be arranged. S. Stucky.

654 Topics in Twentieth-Century Theory and Analysis
Fall. 4 credits. Not offered 1987–88.

656 Modern Orchestration
T 10–12:05. K. Husa.

657–658 Composition
657. Fall; 658. Spring. 4 credits each term.

657. 4 credits each term.
T 2:30–4:25. K. Husa and staff.

659–660 Composition
659. Fall; 660. Spring. 4 credits each term.
T 2:30–4:25. S. Stucky.

[662 Orchestral Conducting]
T 10–12:05. K. Husa.

668 Shostakovich's Twenty-four Preludes and Fugues
Spring. 4 credits.
T 2:30. W. Austin.

681 Seminar in Medieval Music
Fall. 4 credits.
The same as Music 481 plus an additional hour.

683–684 Seminar in Renaissance Music
D. Randel.

686 Seminar in Baroque Music

687 Seminar in Classical Music
Fall. 4 credits. Not offered 1987–88.
T 2:30–4:25. J. Webster.

689–[690 Seminar in Music of the Romantic Era]
689. Fall; [690. Spring]. 4 credits each term. [690 not offered 1987–88.]

691–692 Performance Practice

697–698 Independent Study and Research
967. Fall; 698. Spring. Credit to be arranged.
Hours to be arranged. Staff.

699 Musical Notation
Fall. 4 credits. Not offered 1987–88.
N. Zaslav, K. Husa, J. Hsu, M. Hatch.

781–782 Seminar in Ethnomusicology (also Society for the Humanities 413–414)
R 12:30–2:15.

785–786 History of Music Theory

789 Liturgical Chant in the West
Fall. 4 credits.

Near Eastern Studies


The Department

The Department of Near Eastern Studies (360 Rockefeller Hall, 255-6275) offers courses in the archaeology, civilization, history, languages, and literatures of the Near East. Students are encouraged to take an interdisciplinary approach to the cultures of this region that has had such an important impact on the development of our own civilization and that plays so vital a role in today's world community. The department's course offerings treat the Near East from ancient times to the modern period and emphasize methods of historical and literary analysis. Near Eastern Studies also provides the basic courses in the Program of Jewish Studies.

Faculty exchange with the Shiloah Center, Tel Aviv University.

The Department of Near Eastern Studies has established a faculty exchange program with the Shiloah Center for Middle Eastern and African Studies at Tel Aviv University. Since spring semester 1982, the department has had a professor visiting from the center to teach a course or courses on the modern Middle East in his or her area of specialty. Courses have included a general survey on the history of the modern Middle East and seminars on Egypt, Saudi Arabia, and the Arab-Israeli conflict.

Distribution Requirements

Any two Near Eastern studies history or archaeology courses chosen at the 200 or 300 level that form a reasonable sequence or combination satisfy the distribution requirement in the social sciences. Any two Near Eastern studies civilization or literature courses at the 200 or 300 level that form a reasonable sequence or combination satisfy the distribution requirement in the humanities. NES 197 plus any other Near Eastern studies course will constitute a sequence to fulfill the distribution requirement in either social sciences or humanities, depending on the second course. All 200- and 300-level language courses may fulfill the humanities requirement.

The Major

The student who majors in Near Eastern Studies may concentrate in one of the following five areas:

1. Near Eastern languages and literatures
2. Ancient Near Eastern studies
3. Judaic studies
4. Islamic studies
5. Contemporary Near Eastern studies

The precise sequence and combination of courses chosen to fulfill the major is selected in consultation with the adviser; all majors, however, must satisfy the following requirements (S-U options not allowed):

1) Qualification in one of the languages offered by the department
2) Eight NES courses (which may include intermediate and advanced language courses), including NES 197.
3) Four courses in subjects related to the student's concentration, which may, in some cases, be taken outside the department

Prospective majors should discuss their plans with the director of undergraduate studies before formally enrolling in the department. To qualify as a major, a cumulative grade average of C or better is required.

Study abroad.

There are many opportunities for study in the Near East. Cornell has agreements with the University of Haifa, Hebrew University, Tel Aviv University, and the Technion in Israel, and with the American University in Cairo, that will permit students to enroll for a year or in some cases for a semester. Study in regular university courses at Haifa, Hebrew University, and Tel Aviv University will be permitted for students with adequate language preparation; otherwise, students enroll in the Overseas Study Program of the institution. Students attending Technion must take all course work in Hebrew; courses at the American University in Cairo are taught in English. Students planning to study overseas during their junior year should develop language skills during their freshman and sophomore years.

Kibbutz, cosponsored by Cornell University, the University of Michigan, and Emory University. The Kibbutz program is designed for university students in good standing. It is limited to twenty-five students and will be held at Ef al Study Center of the Kibbutz Movement in Tel Aviv. Application deadline is April 15, 1986. For further details contact the Department of Near Eastern Studies.

Honors.

Candidates for the degree of Bachelor of Arts with honors in Near Eastern languages and literatures, Ancient Near Eastern studies, Judaic studies, or Islamic studies must fulfill the requirements of the appropriate major study and enroll in the honors course, NES 499, in the first semester of their senior year. For admission to the honors program, candidates must have a cumulative average of B+ or better and have demonstrated superior performance in Near Eastern studies courses. After consulting their major
advisor, candidates should submit an outline of their proposed honors work to the department during the second semester of their junior year.

Program of Jewish Studies

The field of Jewish studies encompasses a broad spectrum of disciplines that include civilization, language, literature, and history. The Department of Near Eastern Studies offers students the opportunity to take a wide variety of courses in Jewish studies whose subjects are not represented in this department. Students interested in planning a program in Jewish studies should consult the Department of Near Eastern Studies. For further details see Program of Jewish Studies under "Special Programs and Interdisciplinary Studies."

Freshman Writing Seminars

115 Literature and Politics in the Middle East
Fall. 3 credits. Not offered 1987–88.

125–126 Society, Economy, and Religion in Ancient Israel: King David's Jerusalem
125, fall; 126, spring. 3 credits. [125 not offered 1987–88.] T R 8:40–9:55 Staff.
This seminar investigates daily life as it was experienced during the Davidic monarchy. Through a close reading of the Old Testament and a supplementary use of relevant archaeological discoveries we attempt to sketch a profile of this formative period in Israel's history. Topics include perception and literature, monumental architecture, institutions, and artistic and administrative features of Israelite society.

127 Jewish Identity: Exile and the Search for Meaning in Modern Jewish Literature
Fall. 3 credits.
M W F 2:30. Staff.
Through close readings of texts from different strata of the modern Jewish experience we will work on uncovering a number of literary strategies and models as they relate to cultural, historical, and linguistic concerns. We will be concerned with the active process of reading and of applying that reading to the essay writing that is the ultimate focus of the course. Texts employed will range from Sigmund Freud and Franz Kafka to Elias Canetti, Primo Levi, and Edmond Jabab. This course will be literary although a number of theoretical models will be introduced leading to both classroom discussion as well as a survey of critical method in the field during lecture portions of the course.

154 Harems, Hours, and Hashish: Western Perceptions of the Middle East

Language Courses

101–102 Elementary Modern Hebrew I and II
101, fall; 102, spring. 6 credits each term. Prerequisite for NES 102. 101 or permission of instructor. Satisfactory completion of NES 102 fulfills the qualification portion of the language requirement.
M–F 9:05, 10:10, or 1:25. N. Scharf.
Intended for beginners (section 1 for students without any previous background). A thorough grounding is given in all the language skills, emphasizing reading, writing, grammar, listening, and speaking. (1) Oral comprehension: (a) in the classroom—ability to understand the basic dialogues and passages without the aid of written texts, to use these texts in variation, and to create new ones; (b) in the outside world—ability to meet basic travel needs and daily routine needs, both at work and in a study situation. (2) Reading: (a) in the classroom—ability to read the texts in the lessons, as well as new texts based on materials presented in class, and to deal with extensive readings (i.e., materials based on texts presented in the classroom as well as additional
contextually relevant vocabulary items); (b) in the outside world—ability to read simple road signs, train and bus schedules, menus, simple directions, etc. (3) Writing: (a) in the classroom: ability to communicate by writing short sentences and to construct short dialogues based on simple sentences or brief passages on topics included in classroom discussions; (b) in the outside world—ability to construct simple, very short letters or notes, or brief summaries or reports. (4) Culture: meet basic Hebrew and for the outside world—with ability to think and express oneself both in oral and written modern Hebrew.

103 Elementary Hebrew
Summer (six-week session). 4 credits. Enrollment limited to 18 students.
M–F 8:30–9:45. N. Scharf.
The fundamentals of grammar, syntax, and vocabulary as applied to both conversational and written Hebrew in the modern idiom. Students are expected to know the Hebrew alphabet for the first session of class.

104 Continuing Hebrew
Summer (six-week session). 4 credits. Enrollment limited to 18 students.
Prerequisites: one semester of college Hebrew or permission of instructor.
M–F 10–11. N. Scharf.
For students who seek to build vocabulary, improve grammar and reading proficiency, and express themselves both in oral and written modern Hebrew.

111–112 Elementary Arabic
111, fall; 112, spring. 6 credits each term. Prerequisite for 112: 111 or permission of instructor. Not offered 1987–88.

113–114 Egyptian Arabic (also Arabic 113–114)
113, fall; 114, spring. 4 credits each term. 113: no prerequisite. Prerequisite for NES 114: 113 or permission of instructor. All texts in Roman alphabet. Not offered 1987–88.

121–122 Elementary Classical Hebrew
121, fall; 122, spring. 4 credits each term. Prerequisite for NES 121–122 or equivalent with permission of instructor.
An introduction to Biblical Hebrew that focuses on acquisition of basic language structures and vocabulary and on fluency in reading and translating. In the second term, readings include the Book of Ruth and selections from the Book of Genesis. This course provides the basis for understanding the role of Biblical Hebrew in shaping Modern Hebrew and for the study of the historical development of the Hebrew language.

131–132 Introduction to the Turkish Language (also Turkish 131–132)
131, fall; 132, spring. 3 credits each term.
Hours to be arranged. L. Babby.
The entire grammar of Turkish will be covered, and the last half of the second semester will be devoted to reading modern Turkish prose. This course will be of special interest to linguists who want to acquire a working knowledge of a language whose structure is radically different from that of the familiar Indo-European languages. Special attention will be paid to syntactic structures in Turkish.

171–172 Elementary Yiddish
171, fall; 172, spring. 4 credits each term. Not offered 1987–88.

201–202 Intermediate Modern Hebrew I and II
201, fall; 202, spring. 3 credits each term. Prerequisites for NES 201, 202 or permission of instructor; for NES 202, 201 or permission of instructor. Satisfactory completion of NES 202 fulfills the proficiency portion of the language requirement.
Second-year modern Hebrew. Continued development of reading, writing, composition, listening, and speaking skills. (1) Reading and production: (a) in the classroom—ability to carry on a conversation, listen to a short lecture, or deliver a short lecture on topics covered in the classroom or related topics; (b) in the outside world—ability to interact with speakers of Hebrew and exchange ideas on basic interests and current events, in work or study situations or informal gatherings, and to relay simple information and give directions. (2) Reading: (a) in the classroom—ability to read simplified short stories, news items, and newspaper headlines; (b) in the outside world—ability to read short newspaper items, work directions, maps, plans, etc. (3) Writing: (a) in the classroom—ability to write short compositions, take notes in class, compose schedules, write out directions, etc.; (b) in the outside world—ability to write letters, reports and summaries of events, and to complete questionnaires. (4) Culture: expand knowledge of culture into some areas of literature, popular culture, and historical background.

211–212 Intermediate Arabic
211, fall; 212, spring. 3 credits each term. Prerequisites: for NES 211, one year of Arabic or permission of instructor; for NES 212, 211 or permission of instructor.
The basic structures of literary Arabic are reviewed and reinforced. An appreciation for syntax is developed through readings in classical and modern texts.

221 Readings in Classical Hebrew Literature: The Art of Biblical Narrative
Fall. 3 credits.
Prerequisite: one year of Hebrew, modern or biblical. Not offered 1987–88.

222 Reading in Classical Hebrew Literature: The Art of Biblical Poetry

238 Aramaic

271–272 Hebrew for Academic Studies
3 credits.
Prerequisites: NES 202 or permission of instructor. Fall: M W F 2:30. Spring: M W F 10:10. Staff.
The course is designed for both prospective students in an academic institution in Israel and others desirous of additional studies in professional and technical Hebrew. It aims to bridge the transition into an Israeli university setting by improving the following: (1) an understanding of articles in Hebrew and their technical vocabulary specific to different fields; (2) accurate reading and listening skills. (3) translation and verbal response; (4) understanding and note taking by use of a simulated Hebrew lecture; and (5) language placement test. The course will consist of theoretical elements yet will be tailored as much as possible to individual needs in different fields such as the humanities and the social and natural sciences.

301–302 Advanced Modern Hebrew I and II
301, not offered 1987–88; 302, spring. 4 credits each term. Entire sequence may be repeated for credit.
Prerequisite for NES 301: 302 or equivalent with permission of instructor. Prerequisite for NES 302: 301 or equivalent with permission of instructor. This sequence may be used as literature to fulfill the humanities distribution requirement. Material varies from year to the next.
M W F 9:05. R. Brann.
Advanced study of Hebrew through the analysis of literary texts and expository prose. This course employs a double perspective: the language is viewed through the literature and the literature through the language. Students will develop composition skills by studying language structures, idioms, and various registers of style.

311 Advanced Arabic
Fall. 4 credits. Not offered 1987–88.

312 Advanced Arabic: Classical Historical Texts

333–334 Elementary Akkadian
333, fall; 334, spring. 4 credits each term. Prerequisite for NES 334: NES 333 or permission of instructor.
Hours to be arranged. D. I. Owen.
An introduction to the Semitic language of the
Akkadians and Babylonians of ancient Mesopotamia. Utilizing the inductive method, students are rapidly introduced to the grammar and the cuneiform writing system of Akkadian through selected readings in the Code of Hammurapi, the Descent of Ishtar, and the Annals of Sennacherib. Secondary readings on the history and culture of Mesopotamia provide the background for the study of the language. Knowledge of another Semitic language helpful but not essential.

[335–336 Readings in Akkadian Texts 335, fall; 336, spring. 3 credits. Prerequisite: NES 333–334. Not offered 1987–88.]

[337 Ugurlic Fall. 3 credits. Not offered 1987–88.]

Archaeology

243 The History and Archaeology of Ancient Israel to 450 B.C.E. Spring. 4 credits. TR 11:40–12:55. D. I. Owen. A detailed survey of the history and archaeology of the land of Canaan from the traditional origins of the Israelite tribes in the early second millennium/middle Bronze Age (ca. 2000 B.C.E.) through the Babylonian exile to the arrival of Ezra and Nehemiah (ca. 450 B.C.E.). Lectures on, and discussions of, biblical and Near Eastern literature and sources relating to the history of ancient Israel, as well as an analysis of the archaeological evidence, will form the basis of the course.

261 Ancient Seafaring (also Archaeology 275) Fall. 3 credits. TR 1:25–2:40. D. I. Owen. A survey of the history and development of archaeology under the sea. The role of nautical technology and seafaring among the maritime peoples of the ancient Mediterranean world—Canaanites, Minoans, Mycenaean, Phoenicians, Hebrews, Greeks, and Romans—as well as the riverine cultures of Mesopotamia and Egypt. Evidence for maritime trade, economics, exploration and colonization, and the role of the sea in religion and mythology are discussed.

263 Introduction to Biblical History and Archaeology Summer. 3 credits. Not offered 1987–88.]

254 Agriculture and Society in the Ancient Near East Spring. 3 credits. Not offered 1987–88.]

267 Mediterranean Archaeology (also Classics 219) Fall. 3 credits. Not offered 1987–88.]


262 The History and Archaeology of Ebla Fall. 4 credits. Prerequisite: Archaeology 100 or any introductory course in ancient history or archaeology. Not offered 1987–88.]

264 Introduction to Field Archaeology in Israel Summer. 6 credits. D. I. Owen. An introduction to archaeological fieldwork—excavation techniques, pottery analysis, and recording. Materials studied will range from the early Bronze Age to the Roman period. Emphasis also on the role archaeology plays in the reconstruction of biblical history and the various approaches used to achieve that reconstruction. On-site supervision will be supplemented by regular lectures on the history, culture, and literature of the peoples whose remains will be exposed. Requirements include regularly assigned readings and two papers. Graduate credit by special arrangement.

265 The Divided Monarchy Fall. 4 credits. Prerequisites: NES 243 or permission of instructor. Not offered 1987–88.]

[266 The History and Archaeology of the Ancient Near East (also Archaeology 310) Fall. 4 credits. Not offered 1987–88.]

[267 The History and Archaeology of Ancient Egypt 4 credits. Fall. Not offered 1987–88.]

[461 Seminar in Syro-Palestinian Archaeology: The Israelite Conquest of Canaan Fall. 4 credits. Not offered 1987–88.]

[463 International Trade, Market, and Politics in the Ancient Near East (also Society for Humanities 425) Fall. 4 credits. Not offered 1987–88.]

Civilization

197–198 Introduction to Near Eastern Civilization Fall. 197, fall; 198 not offered 1987–88. 3 credits. Required for all department majors. NES 197 and any other Near Eastern studies course will constitute a sequence to fulfill the distribution requirement in either the social sciences or the humanities, depending on the second course used in combination with 197.

M W F 11:15. R. Brann and staff. This course is designed to provide an introductory overview of Near Eastern society and culture from ancient to modern times for students with little or no previous training. Lectures will focus on several major periods of Near Eastern history: ancient, biblical, Islamic, and modern. In each historical period we will consider the development of major religious ideas, social and political institutions, economic structures, and literary forms. Readings will be chosen from primary sources in translation and modern secondary materials. In addition, movies, slides, and other visual materials will be used as integral parts of the course.

[229 Introduction to Jewish Mysticism Fall. 3 credits. Not offered 1987–88.]

[234 Muslims, Christians, and Jews in Islamic Spain: Literature and Society (also Comparative Literature 234) Spring. 3 credits. Not offered 1987–88.]

241 The Holocaust: The Destruction of European Jewry, 1933–1945 Spring. 3 credits. TR 2:30–4:25. S. Katz. A detailed examination of the main historical and ideological elements relevant to an understanding of the Nazis’ “war against the Jews.” Study of modern anti-Semitism, the Weimar Republic, and Hitler’s seizure of power open the course. This will be followed by a close review of Hitler’s anti-Jewish policy before 1939; the impact of the world war after 1939; and the successive policies of deportation, ghettoization, and mass murder. Attention will also be given to the moral and theological questions raised by these events.

[247 History of Jewish Textual Interpretation Spring. 3 credits. Not offered 1987–88.]

[255 Introduction to Islamic Civilization Spring. 3 credits. Not offered 1987–88.]

293 Judaism and Islam in Comparative Perspective (also Medieval Studies 233) Fall. 3 credits. W 7:30–9:30 p.m. R. Brann. A comparative study of the ideas and institutions of Judaism and Islam. The course will examine the common heritage of these two Near Eastern religious civilizations, their parallels and differences, and their influence on one another. To be discussed are the nature of religious community, the nature of religious authority, attitudes toward scripture, the evolution of legal tradition, religious thought, piety and mysticism, and religious ritual.

[297 Beyond the Stereotype: Images of Women in the Middle East Spring. 3 credits. Not offered 1987–88.]

[343 The Jewish Community Throughout History Spring. 4 credits. Not offered 1987–88.]

[346 Jews of Arab Lands Fall. 4 credits. Not offered 1987–88.]

[357 Islamic Law and Society Spring. 4 credits. Not offered 1987–88.]

History

242 Israel: History and Geography Summer. 10 credits. Not offered 1988.]

243 History and Archaeology of Ancient Israel to 450 B.C.E. Spring. 4 credits. For description see NES 243 under “Near Eastern Archaeology.”

244 Jurisprudence and the Holocaust Fall. 2 credits. M 9:05–11. N. Sher. This seminar will trace the history of judicial efforts to bring to justice the perpetrators of the Holocaust. Emphasis will be on the principles established at the Nuremberg trials, as well as on analysis of measures taken and legal precedent established in Europe, and the United States to uncover and prosecute alleged Nazi criminals.


248 Introduction to Classical Jewish History Fall. 3 credits. MWF 10–11:25. S. Katz. A survey of the major developments in Jewish history between the destruction of the first temple in 586 B.C.E. and the rise of Islam. Topics will include the return under Ezra and Nehemiah; the encounter with Hellenism; the Antiochene persecutions; the growth of Roman influence; the rebellion of 70 C.E.; the rise of such Jewish groups as the Sadducees, Pharisees, and Essenes; the conflict with early Christianity; and the nature of rabbinic Judaism.

249 Introduction to Modern Jewish History Spring. 3 credits. TR 11:40–12:55. S. Katz. A survey of the major developments in Jewish history between the expulsion from Spain (1492) until 1900. Topics will include the growth of mysticism and Hasidism; the development of Eastern European Jewry; the impact of emancipation; the rise of Jewish pluralism, e.g. Reform Judaism, Conservative Judaism, Neo-Orthodoxy; the character of modern anti-Semitism; the origins and growth of American Jewry; and the beginnings of political Zionism.

258 Islamic History 600–1798 Fall. 3 credits. MWF 12:20–1:30. M. Bonner. A survey of Islamic history from the lifetime of Muhammad to Napoleon’s invasion of Egypt, with special emphasis on contacts between the Islamic world and the West. Topics to be discussed will include the emergence of Islam as a major world religion; the effect of the Arab conquests on the unity of the Mediterranean world; political, cultural, and economic contacts between the Near East and Europe; the Crusades; the Spanish Reconquista; the Ottomans in Europe; and the beginnings of European imperialism. Readings from primary sources in English translation.

261 Ancient Seafaring (also Archaeology 275) For description see NES 261 under “Near Eastern Archaeology.”

[264 Agriculture and Society in the Ancient Near East Spring. 3 credits. Not offered 1987–88.]

Near Eastern Studies 193
194 Arts and Sciences

294 Modern History of the Middle East: Changing Politics, Society, and Ideas (also Government 358) Fall. 4 credits. Fulfill the college distribution requirement in history or the social sciences.

295 Modern Hebrew Literature (also Comparative Literature 205) Spring. 4 credits. Reading knowledge of German helpful, though the basic texts will be read in English. Not offered 1987–88.

296 Medieval Hebrew Narrative Fall. 3 credits. Prerequisite: NES 258 or NES 294. Not offered 1987–88.

297 Lebanon: The Formation and Destruction of the Lebanese State (also Government 352) Spring. 4 credits.


The course will discuss the processes leading to the establishment of the Lebanese state and its disintegration. Topics will include the emergence of a Lebanese entity after the civil war of 1860 and sectarian relations, the role of the National Lebanese Maronite Christian Movement and its relations with France and the Arab National Movement, and the development of the unique Lebanese political system as well as the social and economic changes that took place after the establishment of independence. The course will analyze the Lebanese position in the inter-Arab and international arenas and the repercussions of the Arab-Israeli conflict, the causes and outcome of the civil war of 1975–76, the Syro-Israeli confrontation in Lebanon, and the war in 1982 and American intervention.


Literature

[155 Classics of the Arabic Literary Tradition Fall. 4 credits. Not offered 1987–88.]

[205 Masterpieces of Jewish Literature (also Comparative Literature 205) Spring. 4 credits. Not offered 1987–88.]

[207–208 Modern Hebrew Literature in Translation 207, fall; 208, spring. 3 credits. Open to freshmen. Not offered 1987–88.]

[221 Readings in Classical Hebrew Literature: The Art of Biblical Narrative Fall. 3 credits. Prerequisite: one year of Hebrew, biblical or modern. May be used as literature to satisfy the humanities distribution requirement. Not offered 1987–88.]


[223 Introduction to the Bible Fall. 3 credits. M W F 10:10. G. Rendsburg.

This course will survey the main historical, religious, and literary issues raised by a close textual reading of the Hebrew Bible (from Genesis to Deuteronomy). It will be concerned with both situating the Bible in its ancient Near Eastern context as well as with discerning its meaning for contemporary reality. All readings will be in English translation.

[225 Judaic Literature in Late Antiquity: Dead Sea Scrolls and Sectarian Literature Spring. 3 credits. Not offered 1987–88.]


An in-depth study of the biblical books of Exodus, Numbers, and Joshua, detailing the Israelite exodus from Egypt, the wandering period, and the conquest of Canaan. Particular attention paid to literary, historical, cultural, and theological concerns.

[227 Introduction to the Prophets Fall. 3 credits. Not offered 1987–88.]

[228 Genesis Fall. 3 credits. M.W.F 1:25. G. Rendsburg.

An in-depth study of the biblical Book of Genesis within its ancient Near Eastern setting. Particular attention will be paid to literary, historical, cultural, and theological concerns. Concentration on the patriarchal narratives and the story of Joseph.

[231 Masterpieces of Hebrew Literature: A Survey of the Hebrew Literary Tradition (also Comparative Literature 231) Fall. 3 credits. Not offered 1987–88.]


An introduction to medieval Hebrew literature: poetry, rhymed prose, and their-poetics, from Andalusian Spain to Renaissance Italy. The course will examine the poets' love of beauty and enchantment with language. How the poets worked within a highly stylized system of genre conventions, and how themes of love and death defined the parameters of the poets' literary universe, will be studied in depth.

[236 Israel through its Literature (in Translation) Spring. 3 credits. Not offered 1987–88.]

[251 The Modern Arabic Novel Spring. 3 credits. Not offered 1987–88.]

[252 Arabian Nights in the East and the West Spring. 3 credits. Not offered 1987–88.]

[256 A Quest for Identity: The Arabic Short Story Fall. 3 credits. Not offered 1987–88.]

[291 Women in Jewish Literature: Tradition and the Literary Imagination (also Women's Studies 291) Spring. 3 credits. Open to Freshmen. Not offered 1987–88.]

[292 Women in the Hebrew Bible (also Women's Studies 292) Fall. 3 credits. Open to freshmen. May be used for distribution requirements in the humanities, or for a concentration major in Jewish studies or women's studies or Near Eastern studies. Not offered 1987–88.]

[303 Seminar in Modern Hebrew Literature: The Short Story Fall. 4 credits. Not offered 1987–88.]


[375 The Shtetl in Modern Yiddish Fiction in English Translation (also German Literature 375) Fall. 4 credits. Not offered 1987–88.]

[377 Topics in Yiddish Literature (also German Literature 377) Spring. 4 credits. Not offered 1987–88.]

432 Readings in Judeo-Arabic: Medieval Judeo-Arabic and Hebrew Poetics Spring. 4 credits. Prerequisites: Arabic 212, Hebrew 202, or equivalents. Designed for graduate students but open to undergraduates with permission of instructor. Entire sequence may be repeated for credit; readings will vary from year to year. Hours to be arranged. R. Brann.

This course will study the most important texts of Hebrew and Judeo-Arabic poets imprisoned during the Middle ages, from 900 until 1200 for the neoclassical poetical of the Arabic and Andalusian traditions, and later medieval poetic schools centering on the norms of Renaissance rhetoric down to 1600. How each tradition understood the distinction between secular and devotional poetry and separated "truthful" from "feigning" verse will be examined. The course will also consider the relation between poetry and music as defined by different compositional schools and how the poetical of the Hebrew bible was reread in each literary center. Finally, the interplay between intrinsic poetic and extrinsic poetic influences in Iraq, Spain, Provence, and Italy will be studied.

451 Racism, Resistance, and Contestation: Francophone North African Literature (also Society for the Humanities 423) Fall. 3 credits. Prerequisite: knowledge of French.


Many North African writers are the product of the attempt to create "des nouvelles Frances" in the Maghrib area. Their works are the outcome of the unique intersection of the French language and the Arabo-Berber culture. This course will explore how North African writers articulate their experience of racism and counteract French cultural domination. We will analyze the different levels at which Francophone North African texts present a kind of resistance to, and contestation of, French literary and linguistic hegemony. Attention will be given to the complex and changing relationship that exists between the author, his language, and the actual text he produces, in an attempt to reconsider the colonizer-colonized dichotomy. Most readings will be in French.

Special Topics and Independent Study

[341–342 Special Topics in Near Eastern Studies 4 credits. Limited to 25 students; preference will be determined by class standing and prior enrollment in Near Eastern Studies. Not offered 1987–88.]

[491–492 Independent Study, Undergraduate Level Fall or spring. Variable credit. Prerequisite: permission of instructor. Staff.

499 Honors Seminar: Independent Study Fall or spring. Variable credit. Prerequisite: permission of instructor. Staff.
New Testament Seminar (Comparative Literature 428)

[Seminar on Biblical Law (Comparative Literature 427) Not offered 1987–88]

Readings in the New Testament (Comparative Literature 429)

Management

[The Environment of International Business in the Middle East (NBA 583) Not offered 1987–88]

Philosophy


The study of philosophy provides students with an opportunity to become familiar with some of the great ideas and works in the history of thought while developing analytical skills that are valuable in practical as well as academic affairs. It affords the excitement and satisfaction that come from understanding and working toward solutions of fascinating and important intellectual problems.

The curriculum includes substantial offerings in history of philosophy, logic, philosophy of mathematics and science, ethics, social and political philosophy, metaphysics, and theory of knowledge. Any philosophy course numbered in the 100s or 200s is suitable for beginning study in the field. Sections of Philosophy 100 are part of the freshman writing seminar program; they are taught by various members of the staff on a variety of philosophical topics, and because of their small size (eighteen students at most) they provide ample opportunity for discussion. Students who want a broad introduction to philosophy may take Philosophy 101, but many students with special interests may find that the best introduction to philosophy is a 200-level course in some particular area of philosophy; such courses have no prerequisites and are usually open to freshmen.

The Major

Students expecting to major in philosophy should begin their study of it in their freshman or sophomore year. Admission to the major is granted by the director of undergraduate studies of the department on the basis of a student's work during the first two years. Eight philosophy courses are required for the major. They must include at least one course in ancient philosophy (210 or 211, or a course with a large component on Plato and/or Aristotle), at least one course in classical modern metaphysics and epistemology (212 or a course on the empiricists, the rationalists, or Kant), and a minimum of three courses numbered above 300, at least one of which must be numbered above 400 (and be other than 490).

A course in formal logic (e.g., Philosophy 231), while not required, is especially recommended for majors or prospective majors.

Philosophy majors must also complete at least 8 credits of course work in related subjects approved by their major advisers. Occasionally majors may serve as teaching or research aides, working with faculty members familiar with their work.

Honors. A candidate for honors in philosophy must be a philosophy major with an average of B— or better for all work in the College of Arts and Sciences and an average of B or better for all work in philosophy. In either or both terms of the senior year a candidate for honors enrolls in Philosophy 490 and undertakes research leading to the writing of an honors essay by the end of the final term. Honors students normally need to take 490 both terms of their senior year in order to write a satisfactory honors essay. Prospective candidates should apply at the philosophy department office, 218 Goldwin Smith Hall.

Fees

In some courses there may be a small fee for photocopying materials to be handed out to students.

Introductory Courses

These courses have no prerequisites; all are open to freshmen.

100 Freshman Seminar in Philosophy

101 Introduction to Philosophy
Fall or spring.

3 credits

Fall: M W F 9:05. N. Sturgeon. Readings in classic works of philosophy (such as those of Plato, Aquinas, Descartes, Hume, Mill, Russell) concerned with any of several central philosophical issues—the foundations of knowledge, reality and illusion, free will, the mind-body problem, the basis of morality, and the existence of God.

Spring: T R 10 10—11:25. A. Appiah. The course aims to give a preliminary answer to the question "What is philosophy?" But rather than addressing this question head on, we will begin with some examples of philosophical work. We will consider key issues about seven central topics: mind, knowledge, language and logic, science, morality, politics, and law. At the end of the course we will ask what we have learned about the distinctive style of philosophical thought. Students will be better able to see how philosophy fits into our culture when they have a feel for how philosophers argue and what they argue about.


[201 Philosophical Problems Fall. 4 credits. Not offered 1987–88]

[210 Ancient Thought Fall. 4 credits. Not offered 1987–88]

[211 Ancient Philosophy Fall. 4 credits.

T R 10:10. G. Fine. An introduction to ancient Greek and Roman thought: the pre-Socratics, Socrates and Plato, Aristotle; and the Stoics, Epicureans, and Skeptics. Topics to be considered include the following: the nature of reality, the nature and limits of knowledge and of sense-perception, justice and happiness, the good man and the good life for man, the nature of the soul, the nature of divinity, and free will.

[212 Modern Philosophy Spring. 4 credits.


[213 Existentialism Fall. 4 credits.

T R 2:55. A. Wood. A study of selected writings, literary as well as philosophical, of four major "existentiasts" thinkers in the nineteenth and twentieth centuries: Kierkegaard, Dostoevsky, Nietzsche, and Sartre.

Goldwin Smith Hall.
231 Introduction to Formal Logic 4 credits.
J. Jarrett
Analysis and evaluation of deductive reasoning in terms of formalized languages. The logic of sentences, predicates, and quantifiers. (This course, rather than Philosophy 331, is the recommended introductory formal logic course.)

251 Medieval Philosophy 4 credits.
Spring.
T R 10:10. N. Kretzmann.
An introduction to medieval philosophy concentrating on such topics as the relation of faith and reason, the nature of truth, the existence of God, universals in knowledge and reality, and the freedom of the will in the writings of such figures as Augustine, Boethius, Anselm, Aquinas, Scotus, and Ockham. Some attention will be given to the historical development of philosophy from the end of antiquity through the fourteenth century.

261 Knowledge and Reality Fall. 4 credits.
T R 1:25. A. Appiah
The course will focus on three important questions about knowledge. What is it to know something? What sorts of things can be known—in particular, is there such a thing as moral knowledge? What either about scientific or about moral questions—relative to our own personal or cultural presuppositions?


263 Religion and Reason Fall. 4 credits.
T R 8:40. N. Kretzmann.
Recent and traditional literature will be taken into account in the examination of such topics as evidence for and against the existence of a god, philosophical problems associated with the attributes of God as described in the great monotheistic religions, and philosophical problems associated with the relationship of God to the physical universe and to human beings.

286 Science and Human Nature Spring. 4 credits.
An examination of attempts in the biological and social sciences to offer scientific theories of human nature and human potential and to apply such theories to explain important social and psychological phenomena. Topic for 1987–88: Darwin, social Darwinism, and sociobiology.

Intermediate Courses

Some of these courses have prerequisites.

309 Plato Fall. 4 credits. Prerequisite: at least one previous course in philosophy.
T R 1:25. G. Fine.
A systematic survey of most of Plato's dialogues. The focus is on metaphysics and epistemology, but some attention will also be paid to ethical theory.


311 Modern Rationalism Fall. 4 credits.
T R 1:25. G. Fine.
The focus will be on Descartes, but some attention will be paid to Spinoza and Leibniz. Topics for the course will include substance, necessity, and possibility; free will and determinism; proofs for the existence of God; innate ideas; and skepticism and the limits of knowledge.

312 Modern Empiricism Spring. 4 credits.
M W F 9:05. N. Sturgeon.
Locke, Berkeley, and Hume. Substance, causality and necessity; meaning and the possibility of scientific and moral knowledge. Historical and critical emphasis with some illustrations of influences on more-recent empiricist theories.


316 Kant Fall. 4 credits.
T R 11:40–12:55. A. Wood
Introduction to Kant's main doctrines in metaphysics, theory of knowledge, and ethics. Topics include the possibility of nonempirical knowledge, the nature of space and time and our knowledge of them, proof of the existence of an objective world, why events must have causes, determinism and the possibility of free will, and the basis of morality.


319 Philosophy of Marx Spring. 4 credits.
T R 2:55. R. Miller.
An investigation of Marx's theories of economics, politics, and ideology in modern societies; his materialist framework for explaining social change; and the view of a postcapitalist society. Attention will be paid to the philosophy of science implicit in Marx's arguments, their implications for issues in moral philosophy, and their relevance to contemporary moral and political controversies concerning war, racism, nationalism, political repression, and social inequality. Readings will be from all periods of Marx's development, including the early writings, Capital, and the writings on French political history.

331 Formal Logic Spring. 4 credits. Prerequisite: Philosophy 231 or equivalent.
M W F 11:15. H. Hodges.
Review of derivations and other material covered in Philosophy 231; basic set theory; truth in a model and the semantic definitions of consequence, validity, equivalence; and other logic concepts, and the soundness and completeness of a natural-deduction formalization of elementary logic. Further topics will be covered if time permits.

332 Semantics Fall. 4 credits. Prerequisite: Philosophy 231 or permission of instructor.
M W F 10:10. R. Stalnaker.
An introduction to the philosophy of language. The nature of representation and communication, alternative conceptions of meaning, the analysis of speech acts, presupposition, theories of reference, and the relation between speech and thought.

334 History of Ethics—Ancient and Medieval Fall. 4 credits.
The development of moral theory in Greek, Roman, and medieval philosophers. Socrates and his questions about morality; the different answers of Plato, Aristotle, and the Stoics; and the influence of Christian thought. Main questions: happiness, welfare, and the human good; the virtues; self-interest and the interests of others; love, friendship, and morality; theories of human nature and their relation to ethics; comparisons and contrasts with modern moral theory. Readings mainly from Plato, Aristotle, the Stoics, St. Paul, St. Augustine, St. Thomas Aquinas. No prerequisites.

335 History of Ethics—Modern Spring. 4 credits. (Philosophy 344 is not a prerequisite for 335.)
A continuation of Philosophy 344. Hobbes's challenge to Greek and Christian ethics, responses to Hobbes, self-interest and the interests of others, the place of reason and sentiment in ethics, the objectivity of ethics, different conceptions of the right and the good, utilitarianism and its critics, and radical critiques of morality. Readings mainly from Hobbes, Butler, Hume, Kant, Sidgwick, Nietzsche, Bradley, and Rawls.

346 Contemporary Political Philosophy Fall. 4 credits.
A study of the leading philosophical arguments about rights, equality, liberty, democracy, and the general welfare as they affect basic choices among institutions and political strategies. Topic for 1987–88: liberalism and its critics—Rawls and rival theories developed by utilitarians, libertarians (Nozick, in particular), and Marxists.

361 Metaphysics and Epistemology Fall. 4 credits.
M W F 1:25. J. Jarrett.
The course will focus on the notion of "causal necessity" and a cluster of related issues (involving,
e.g., propensities, confirmation of laws, the relation between laws and conditions, scientific explanation). We will follow an approach (due to Brian Skyrms) that is motivated by a concern for the epistemology and pragmatics of laws. In this approach, causal necessity is best understood by appeal to a special condition of probabilistic invariance under change in physical circumstances. Some background in elementary logic is recommended.


381 Philosophy of Science: Knowledge and Objectivity Fall. 4 credits.
M 7–9:30 p.m. R. Boyd.
An examination of central epistemological and metaphysical issues raised by scientific reasoning: the nature of evidence: scientific objectivity; the nature of theories, models and paradigms, and the character of scientific revolutions. In addition to the contemporary literature in the philosophy of science, readings are also drawn from the works of classic modern philosophers such as Locke, Hume, and Descartes.


383 Philosophy of Choice and Decision Spring. 4 credits.
Philosophical foundations and applications of theories of rational decision making. Interpretations of probability and utility, risk and uncertainty, causal decision theory, applications of game theory, and theories of collective choice.


390 Informal Study Fall or spring. Credit to be arranged.
Staff.
To be taken only in exceptional circumstances. Must be arranged by the student with his or her adviser and the faculty member who has agreed to direct the study.

Advanced Courses and Seminars

These courses are offered primarily for majors and graduate students.


413 Plato and Aristotle Spring. 4 credits.
Prerequisites: at least two previous courses in philosophy.
T 14:55. G. Fine.

414 German Philosophy after Kant Spring. 4 credits.
Prerequisite: at least one previous course in philosophy or at least one course in a related field, government, or history dealing with modern European thought.
T R 11:40. A. Wood.


444 Contemporary Legal Theory (also Law 710) Spring. 4 credits.
T 4–5:40. D. Lyons.
The problem of justifying judicial decisions in “hard” cases (e.g., when the law is unclear) and proposed solutions to it. (This is a Law School seminar of limited size. If enrollment permits, others may be admitted on application to, and at the discretion of, the instructor.)


461 Metaphysics Fall or spring. 4 credits.
Fall: T R 10:10–11:35. A. Appling.
The verificationism of the logical positivists entailed a kind of idealism. It required that we could make intelligible claims only about what we could, in some sense, know, and then drew the conclusion that since only intelligible claims could be true, truth itself—or reality—was also limited to what could be known. This course will discuss these questions: Is there a sense of “could” that makes this claim true? If so, what consequences can we draw from verificationist constraints about the nature of our understanding of reality? Finally, can we in fact draw consequences from these constraints about the nature of reality itself?

481 Problems in the Philosophy of Science Spring. 4 credits.
T R 11:40. J. Jarrett.
A study of the logical and conceptual structure of quantum mechanics. Topics to be discussed include Heisenberg’s Principle, complementarity and the Copenhagen Interpretation, quantum logic, the measurement problem, the “paradoxes” (Schrodinger’s cat, Wigner’s friend, the EPR argument), Bell’s Theorem, and the Everett-Wheeler (“many-worlds”) Interpretation. Some previous training in physics or mathematics is recommended, but no specialized background will be presupposed. The course will attempt to provide a philosophically responsible account of the structure of quantum mechanics in a way that fosters insight into the reasons certain aspects of the theory remain controversial.

490 Special Studies in Philosophy Fall or spring. 4 credits.
Staff.
Open only to honors students in their senior year.

611 Ancient Philosophy Fall. 4 credits.
W 4:15. T. Irwin.

612 Medieval Philosophy Spring. 4 credits.
M 4:15. N. Kretzmann.

613 Modern Philosophers Fall. 4 credits.
M 4:15. N. Sturgeon.
Human nature, politics, and morality in Hobbes, Butler, and Hume.


641 Ethics and Value Theory Spring. 4 credits.
W 4:15. R. Miller.
Topic for 1987–88: justification, objectivity, and personality in ethics and political philosophy.


662 Philosophy of Mind Fall. 4 credits.
R 4:15. R. Stalnaker.

664 Metaphysics Fall. 4 credits.
T 4:15. K. Olson.
Topic: facts. One of the more exhilirating statements in Wittgenstein’s Tractatus is that the world is the totality of facts, not things. In this seminar we will consider the pros and cons of any theory that takes facts seriously and the difficulties of making sense of our ordinary language. Literature will be taken into account.


700 Informal Study Fall or spring. Credit to be arranged.
Staff.
To be taken by graduate students only in exceptional circumstances and by arrangement made by the student with his or her Special Committee and the faculty member who has agreed to direct the study.

Physics


The Department of Physics offers a full range of university-level work in physics, from general education courses for nonscientists to Ph.D.-level independent research. Major research facilities are operated by two component organizations, the Laboratory of Atomic and Solid State Physics (LASSP) and the Laboratory of Nuclear Studies (LNS). LASSP carries on extensive research efforts in condensed-matter physics and in low-temperature physics. LNS operates a major high-energy particle physics research facility at Wilson laboratory, the Cornell electron–positron storage ring, called CESR. Theoretical work is carried out in many fields of physics, including astrophysics. There is a full schedule of weekly research-oriented seminars and colloquia. Junior and senior students will find many opportunities for research participation and summer jobs.

Three introductory physics sequences are open to freshmen: 101–102, 122–123–C1–215, and 207– 208. In addition, there is a cluster of general-education courses, Physics 201 through 206. Physics 101–102, a self-paced autotutorial course, is designed for students who do not intend to take further physics courses and who do not have preparation in calculus. Physics 112 and 207 both require calculus (Mathematics 191 or 111), and additional mathematics is required for subsequent courses in sequence. Physics 101–102 or
207–208 may be taken as terminal physics courses. The three- (or four-) term sequence 112–213–214 (–315) or 161–217–218 (–315) is recommended for engineers and physics majors.

Courses beyond the introductory level that might be of interest to nonmajors are Physics 315, Phenomena of Microphysics, Physics 330, Modern Experimental Optics, and Physics 360, Elementary Electronic Circuits.

Advanced placement and credit are offered as outlined in "Advanced Placement of Freshmen," or students may consult Professor Cotts, 522 Clark Hall. Transfer students requesting credit for physics courses taken at another college should consult the department office.

The Major

Various options permit the student to concentrate deeply on physics or to take less physics and pursue an accompanying constellation of courses in a related area. Those desiring a physics concentration as preparation for professional or graduate work should complete Physics 112–213–214 or 116–217–218, and, if possible, 315 by the end of the sophomore year. A basic preparation for a less intensive physics program may include Physics 120–213–214 or 207–208–214. In either case, it is necessary to complete a concurrent sequence of mathematics courses.

Mathematics 191–192–293–294 are usually recommended, except for students especially interested in continuing the study of mathematics, for whom Mathematics 111–112–221–222 (or equivalent) may be preferred.

Prospective majors are urged to make an early appointment at the physics office for advice in planning their programs. Acceptance into the major is normally granted after completion of a year of physics and mathematics at a satisfactory level; the student should propose a tentative plan for completing his or her graduation requirements as well as those for the major.

The plan may change from time to time, but it must be approved by the major adviser. The major requirements have two components—a core and concentration.

Core requirements for the major include:


2) An intermediate physics course in each of four areas: (a) mechanics—Physics 318 or 431, (b) electricity and magnetism—Physics 325 or 432, (c) modern physics—Physics 316 or 443, and (d) laboratory physics—Physics 310 (when not taken as substitute for laboratory work in 214 or 218), 330, 360, or 410.

Mathematics courses prerequisite for these physics courses are also necessary. The choice of core is influenced by the intended concentration. For a concentration in physics, Physics 116–217–218 (or 112–213–214), 315, 316, 325, and any 300-level laboratory course is appropriate, while for concentrations outside physics, part (2) of the core might consist of, for example, Physics 315, 360, 431, 432.

The concentration reflects the student’s interest in some area related to physics; the array of courses must have internal coherence and be approved by the major adviser. The concentration must include at least 15 credits, with at least 8 credits in courses numbered above 300. Students have chosen to concentrate in such topics as physics, biophysics, chemical physics, astrophysics; geophysics; natural sciences; history and philosophy of science; computational physics, or physics with emphasis on business. A combined biology-chemistry concentration is recommended for premedical students or those who wish to prepare for work in biophysics. The concentration in natural science is particularly appropriate for teacher preparation.

The concentration in physics is recommended as preparation for professional or graduate work in physics or a closely related discipline. Twelve of the 15 concentration credits must be selected from physics courses numbered above 300 (in addition to those selected for part (2) of the core); Physics 410 must be included within those twelve. The following courses are strongly recommended: Physics 341, 443; Mathematics 421, 422, and 423; and at least one of Physics 444, 454, Applied and Engineering Physics 401, 434, Astronomy 431, 432, or Geological Sciences 388.

Foreign language requirement. Students interested in eventual graduate work in physics are advised to meet this requirement with French, German, or Russian.

Honors. A student may be granted honors in physics upon the recommendation of the Physics Advisers Committee of the physics faculty.

Distribution Requirement

The requirement in physical sciences is met by any two sequential courses such as Physics 101–102 or 207–208 or 112–213 or any combination of the first term of one sequence and the second term of another. It is also met by any two general education courses from the group 201–206 or by a combination of 101 or 112 or 207 with 204, 205, or 206.

Courses with Overlapping Content

Because the department offers several courses with overlapping content, students should select courses carefully to meet the needs of their academic programs and to ensure credit for each course they take. Listed below are groups of courses with similar content. In general, students may receive credit for only one of the courses in each group.

Physics 101, 112, and 207

Physics 102 and 208

Physics 116, and 207

Physics 208, 213, and 217

Physics 201 if preceded by 101 or 102

Physics 202 if preceded by 101 or 102

Course Prerequisites

Prerequisites are specified in course physics descriptions to illustrate the materials that students should have mastered. Students who wish to plan programs of work that may include more modern physics and less mathematical analysis should elect Physics 207–208 or 121–213–214. A mostly self-paced, mastery-oriented autotutorial format; students work in a learning center at hours of their convenience.

Physics 201: Mechanics and Heat

Fall or spring. 4 credits. A more analytic version of Physics 102, intended for students who will be comfortable with a deeper, somewhat more abstract approach. (Intended mainly but not exclusively for prospective physics majors.) Prerequisites: a good secondary school physics course and familiarity with basic calculus. Credit transfers between Physics 116 and Physics 121 (in either direction) are encouraged during the first few weeks of instruction.

Lec, M W F 10-11; rec, MWF 2-3; lab, T R 2-3. 4 credits; rec 3:35–4:25. A. Sadoff. This is a descriptive physics course aimed specifically at the non-science student. There is an emphasis on the ideas of modern physics where the approach is both historical and thematic. The methodology of science and the nature of evidence is emphasized. An overriding theme is the character of physical laws as shown through the great principles of symmetry and conservation. While the computational problems assigned, the purpose is to help students understand the concepts rather than to master problem-solving techniques.

The Physics of Space Exploration and of Astronomy

Spring, 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but will use high-school mathematics.

Lec, M W F 2:30; disc, W 3:35. E. Salpeter. The principles of physics (plus simple mathematics) are applied to gain knowledge about planets, stars, galaxies, and the universe.

204 Physics of Musical Sound

Fall, 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but will use high-school algebra.

Lec, M W F 2:30; disc, T 3:35. E. Cassel. Many features of the production, propagation, and perception of musical sound may be understood in terms of important concepts in physics. Topics covered will include the mechanism of tone production in musical instruments, the distinction in tone quality among different instruments, scales, intervals, and tuning, and some aspects of the mechanism of hearing. At the level of Physics and the Sound of Music, by Rigden.

205 Reasoning about Luck

Fall, 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but will use high-school algebra.

Lec, M W F 2:30; disc, T 3:35. E. Cassel. Many features of the production, propagation, and perception of musical sound may be understood in terms of important concepts in physics. Topics covered will include the mechanism of tone production in musical instruments, the distinction in tone quality among different instruments, scales, intervals, and tuning, and some aspects of the mechanism of hearing. At the level of Physics and the Sound of Music, by Rigden.

116 Physics I: Mechanics and Heat

Fall or spring. 4 credits. A more analytic version of Physics 102, intended for students who will be comfortable with a deeper, somewhat more abstract approach. (Intended mainly but not exclusively for prospective physics majors.) Prerequisites: a good secondary school physics course and familiarity with basic calculus. Credit transfers between Physics 116 and Physics 121 (in either direction) are encouraged during the first few weeks of instruction.

Lec, M W F 10-11; rec, MWF 2-3; lab, T R 2-3. 4 credits; rec 3:35–4:25. A. Sadoff. This is a descriptive physics course aimed specifically at the non-science student. There is an emphasis on the ideas of modern physics where the approach is both historical and thematic. The methodology of science and the nature of evidence is emphasized. An overriding theme is the character of physical laws as shown through the great principles of symmetry and conservation. While the computational problems assigned, the purpose is to help students understand the concepts rather than to master problem-solving techniques.

203 The Physics of Space Exploration and of Astronomy

Spring, 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but will use high-school mathematics.

Lec, M W F 2:30; disc, W 3:35. E. Salpeter. The principles of physics (plus simple mathematics) are applied to gain knowledge about planets, stars, galaxies, and the universe.

204 Physics of Musical Sound

Fall, 3 credits. Intended for nonscientists; does not serve as a prerequisite for further science courses. Assumes no scientific background but will use high-school algebra.

Lec, M W F 2:30; disc, T 3:35. E. Cassel. Many features of the production, propagation, and perception of musical sound may be understood in terms of important concepts in physics. Topics covered will include the mechanism of tone production in musical instruments, the distinction in tone quality among different instruments, scales, intervals, and tuning, and some aspects of the mechanism of hearing. At the level of Physics and the Sound of Music, by Rigden.
probabilistic mechanics follows. In this way, interested students are given a nontrivial understanding of the second law of thermodynamics, that putative bridge between C. P. Snow's two cultures. Another physical theory, quantum mechanics, is introduced only in chance occurrence—though in a somewhat mysterious way—is touched on. Approximately five self-paced laboratory experiments will be included.

206 War and Peace in the Nuclear Age Spring. 4 credits. Intended for nonscientists; does not serve as a prerequisite to further science courses. Assumes no previous knowledge of nuclear weapons but does use high school mathematics. Not offered 1967-88.
Lec., T 12:20-1:35, 1 rec each week. P. Stein.

This course is intended for any student who wishes to understand the following: the principles, types, and effects of nuclear weapons; existing and proposed arsenals and delivery systems; the evolution and present status of the nuclear military strategy of the nuclear powers; and the history of, and current issues in, nuclear arms control negotiations. Additionally, the course will examine critically the important concepts involved in nuclear strategy and arms control. Attention will also be given to the moral and ethical questions involved. Assumed background: some development of quantitative reasoning skills as well as knowledgeability about technical aspects of the subject matter.

207-208 Fundamentals of Physics 207. Fall: 208, spring: 4 credits each term. Prerequisites for Physics 207: high school physics plus coregistration in Mathematics 112 or 113. Lec., T 9:05 or 11:15; 2 recs each week; one 3-hour lab alternate weeks. Exams: fall, Oct. 8, Nov. 12, spring, Mar. 3, Apr. 12. Fall, R. Silsbee; spring, R. Galik.

Prerequisites: Newton's laws, conservation of energy, and statistical mechanics. Similar material is covered in Physics 431 at a less demanding analytical level. (Applied and Computational Physics students may wish to take Physics 214, which they can do without difficulty at that time. No previous experience with electronic circuits is assumed; however, the course moves into the use of operational amplifiers and their applications. Discrete devices (diodes, bipolar transistors, and field-effect transistors) are covered briefly. In digital circuits, some time is spent on combinational logic design. This experience is then applied to problems in programming and interfacing a simple microcomputer.

300 Modern Experimental Optics Spring. 4 credits. Enrollment limited to approximately 20 students. Prerequisites: Physics 214 or equivalent. Lec., T 2:30; lab, T W 1:25-4:15 or R F 1:25-4:15. Staff.
A practical laboratory course in basic and modern optics. Students spend two-thirds of the course experimenting with the physics of basic optical phenomena: interference, diffraction, coherence, polarization, and image formation. The last part of the course involves a choice among experiments on lasers and applications of lasers, infrared and optical communication, and holography. The course also serves as an introduction to the use of optical equipment and techniques that are employed in current research in the fields of biology, chemistry, physics, and astronomy.

310 Intermediate Experimental Physics Fall or spring. 3 or 4 credits. Prerequisite: Physics 208 or 213. May be taken concurrently with Physics 214 or 218 and in place of the lab work offered in Physics 214, with permission of the student's advisor. Lbs., R F 1:25-4:25, Fall, R. Galik; spring, J. Reppy. Students select from a variety of experiments. An individual, independent approach is encouraged. Facilities of the Physics 410 lab are available for some experiments.

315 Phenomena of Microphysics Fall or spring. 4 credits. Primarily for students of engineering and for prospective majors in Physics. Prerequisites: Physics 214 and Mathematics 294. Lec., M W F 9:05, R 2:30; spring, T R S 9:05, T 2:30. Fall, H. Kragh; spring, T. M. Yan.

This introductory course covers atoms, nuclei, and elementary particles, emphasizing the description of phenomena using the results of elementary quantum and statistical physics. At the level of Quantum Physics of Atoms, Molecules, Solids, Nuclei and Particles, by Eisberg and Resnick.

318 Analytical Mechanics Spring. 4 credits. Prerequisites: Physics 208 or 214 plus one of Mathematics 241, 422, or 423, or permission of instructor. Intended for physics majors concentrating in physics. Similar material is covered in Physics 431 at a less demanding analytical level. (Applied and Engineering Physics 333 is approximately equivalent to Physics 318.)

Newtonian mechanics of particles and systems of particles, including rigid bodies; oscillating systems; gravitation and planetary motion; moving coordinate systems; Euler's equations; Lagrange's equations; Hamilton's equations, normal modes and small vibrations. At the level of Classical Dynamics, by Marion.

325 Electricity and Magnetism Fall. 4 credits. Prerequisites: Physics 214 plus coregistration in one of Mathematics 421, 422, or 423, or permission of instructor. Intended for physics majors concentrating in physics. Similar material is covered in Physics 432 at a less demanding analytical level.

Lec., T R S 11:15, T 3:35. B. Gittelman.

Electrostatics: electric charge and fields, potential, multipole, conductors, Laplace equation and formal solutions, field energy, dielectric materials, polarization. Magnetostatics: currents, magnetic fields and vector potential, dipole, magnetic field, Maxwell's equations. Special relativity. At the level of Introduction to Electro-dynamics, by Griffiths.


Electrodynamics: applications of Maxwell's equations, wave propagation, radiation, transmission lines, wave guides, interference and diffraction phenomena. At the level of Classical Electromagnetic Radiation, by Marion.

330 Modern Experimental Optics Spring. 4 credits. Enrollment limited to approximately 20 students. Prerequisites: Physics 214 or equivalent. Lec., T 2:30; lab, T W 1:25-4:15 or R F 1:25-4:15. Staff.

A practical laboratory course in basic and modern optics. Students spend two-thirds of the course experimenting with the physics of basic optical phenomena: interference, diffraction, coherence, polarization, and image formation. The last part of the course involves a choice among experiments on lasers and applications of lasers, infrared and optical communication, and holography. The course also serves as an introduction to the use of optical equipment and techniques that are employed in current research in the fields of biology, chemistry, physics, and astronomy.
200 Arts and Sciences

410 Advanced Experimental Physics Fall or spring. 4 credits. Limited to seniors except by special permission. Prerequisites: Physics 214 (or 310 or 360) plus 318 and 325, or permission of instructor. Lec, M W F 10:10-11:25; R 3:35. J. Franz. An introduction to modern solid-state physics, including lattice structure, lattice vibrations, thermal properties, electron theory of metals and semiconductors, magnetic properties, and superconductivity. 2 credits. Limited to senior physics majors and those who receive permission of instructor. S-U grades only. Hours to be arranged. One selected topic of current interest is studied. Students participate in organization and presentation of material.

490 Independent Study in Physics Fall or spring. 1–3 credits. Ordinarily limited to seniors. Prerequisite: permission of professor who will direct proposed work. Copy of request for independent study form must be filed with physics department course coordinator. Individual project work (reading or laboratory) in any branch of physics.

500 Informal Graduate Laboratory Fall, spring, or summer. Variable credit.

506 Design of Electronic Circuits Fall. 3 credits. Not offered 1987–88. M W 9:05 plus lab hours to be arranged. Staff. Circuit techniques and design in electronic measurement and instrumentation, with emphasis on applications to physics experiments. At the level of The Art of Electronics, by Horowitz and Hill.

510 Advanced Experimental Physics Fall, spring or summer. 3 credits. Labs, T W 1:25-4:25. Staff. About seventy different experiments are available in acoustics, optics, spectroscopy, electrical circuits, electronics and ionics, magnetic resonance, X-rays, low temperature, solid state, cosmic rays, nuclear physics. The student performs three to six diverse experiments, depending on difficulty, selected to meet individual needs and interests. Independent work is stressed.

431-432 Introductory Theoretical Physics I and II 431 fall; 432, spring. 4 credits each term. Prerequisites: Physics 431. 200 Arts and Sciences to meet individual needs and interests. Independent diverse experiments, depending on difficulty, selected by Griffiths. Introduction to Electrodynamics, by Lees. M 1:25-3:30; labs, M W F 9:05, F 1:25. M. Lipkin.

431: Mechanics. Includes Newtonian mechanics, Lagrangian's and Hamiltonian's equations, central forces, rigid-body motion, and small oscillations. At the level of Mechanics, by Symon. 432: Electricity and magnetism. Includes electrostatics, magnetostatics, boundary value problems, dielectric and magnetic media. Maxwell's equations and electromagnetic waves, introduction to special relativity. At the level of Introduction to Electrodeodynamics, by Griffiths.

443 Introductory Quantum Mechanics Fall. 4 credits. Prerequisites: Physics 318 and 325, or 431–432; Physics 315 and Mathematics 421; or permission of instructor. Lecs, M W F 9:05, M 1:25. Evening exams may be scheduled. S. Teukolsky. Introduction to concepts and techniques of quantum mechanics, at the level of Introduction to Quantum Mechanics, by Dicke and Wittke.

444 Nuclear and High-Energy Particle Physics Spring. 4 credits. Prerequisite: Physics 443 or permission of instructor. Lecs, M W F 9:05, F 1:25. D. Rubin. Behavior of high-energy particles and radiation; elementary particles; basic properties of nuclei; nuclear reactions; nuclear forces; cosmic rays; general symmetries and conservation laws. At the level of Concepts of Particle Physics, by Gottfried and Weiskopf.

454 Introductory Solid-State Physics Fall or spring. 4 credits. Prerequisite: Physics 443 or Chemistry 793, or permission of instructor. Lecs, fall, M W F 10:10, R. Cotts; spring T R 10:10–11:25; R 3:35. J. Franz. An introduction to modern solid-state physics, including lattice structure, lattice vibrations, thermal properties, electron theory of metals and semiconductors, magnetic properties, and superconductivity.

481-489 Special Topics Seminar Spring. 2 credits. Limited to senior physics majors and those who receive permission of instructor: S-U grades only. Hours to be arranged. One selected topic of current interest is studied. Students participate in organization and presentation of material.

551 Classical Mechanics Fall. 3 credits. Prerequisite: an undergraduate course in classical mechanics at the level of books by K. Symon or J. D. Birej. Lecs, T R 10:10-11:15. R. Siggia. Lagrangian and Hamiltonian formulation of classical mechanics, with modern applications in nonlinear dynamics. Foundations will be taught at the level of Mechanics, by Landau and Lifschitz.

553-554 General Relativity (also Astronomy, 509–510) 553, fall; 554, spring. 4 credits. Prerequisite: knowledge of special relativity at the level of Classical Mechanics, by Goldberger. Offered alternate years. Not offered 1987–88. Fall: lec, T R 2:30–3:40. Spring: lec, T R 10:10–11:35. S. Shapiro. Physics 553 is a systematic introduction to Einstein's theory, with emphasis on modern coordinate-free methods of computation. Topics include review of special relativity, modern differential geometry, foundations of general relativity, laws of physics in the presence of a gravitational field, experimental tests of gravitational theories, and the concept of Gravitation, by Misner. Physics 554 is a continuation of 553 that emphasizes applications to astrophysics and cosmology. Topics include relativistic stars, gravitational collapse and black holes, gravitational waves, cosmology.

561 Classical Electrodynamics Fall. 3 credits. Lecs, T R 8:30–9:55. D. Yennie. Maxwell's equations, electromagnetic potentials, electrodynamics of continuous medium (selected topics), special relativity, radiation theory. At the level of Classical Electrodynamics, by Jackson.

562 Statistical Mechanics Spring. 4 credits. Primarily for graduate students. Prerequisites: A good knowledge of quantum mechanics (by Merzbacher), classical mechanics (at the level of Marion), and statistical mechanics (at the level of Reif). Lecs, T R 8:30–10: W. N. Ashcroft. Thermodynamics of phase transitions, critical phenomena, phase equilibria: thermodynamic inequalities, Microstates, ensembles, partition functions, and phase-space averaging. Chemical equilibria. Scattering probes, correlation functions, and fluctuations. Quantum statistical mechanics, Fermi-Dirac and Bose-Einstein distributions; Bose-Einstein condensation. Ideal crystals. Virial expansion, simulation methods, metallic and insulating liquid phase transitions. Density matrix, response methods, and transport. Lattice gases and spin systems; Ising model and critical exponents, melting, freezing, and the wetting of interfaces. At the level of Statistical Mechanics, and by Pathria, Statistical Mechanics, by McQuarrie.

572 Quantum Mechanics I Fall or spring. 4 credits. Lecs, fall, M W F 9:05, K. Gottfried; spring, M W F 11:15 (disc, M 3:30 spring only), N. D. Mermin. The formulation of quantum mechanics in terms of states and operators. Symmetries and the theory of angular momentum. Stationary and time-dependent perturbation theory. Fermi's golden rule, and variational methods. The elements of scattering theory. At a level between Quantum Mechanics, by Merzbacher, and Quantum Mechanics, by Landau and Lifschitz. Familiarity with elementary aspects of the Schroedinger equation is assumed, including its application to simple systems such as the hydrogen atom.

574 Quantum Mechanics II Fall or spring. 4 credits. Required of all Ph.D. majors in theoretical physics. Lecs, fall, M W F 9:05, V. Ambegaokar; spring, M W F 11:15, K. Gottfried. Discussion of various applications of quantum mechanics, such as collision theory, theory of spectra of atoms and molecules, theory of solids, emission of radiation, relativistic quantum mechanics. At the level of Lectures on Quantum Mechanics, by Gordon Baydon.

635 Solid-State Physics I Fall. 3 credits. First semester of a two-semester sequence of solid-state physics for graduate students who have had the equivalent of Physics 572 and 562 and some prior exposure to solid-state physics, such as Physics 454. Lecs, T R 11:40–12:55. J. Sethna. Electronic and phonon properties of metals and insulators, including transport processes. Discussions at the level of Solid State Physics, by N. W. Ashcroft and N. D. Mermin.

636 Solid-State Physics II Spring. 3 credits. Lecs, M W 10:10–11:25. J. Sethna. Concepts developed in Physics 635 are extended and applied in a survey of the following: equilibrium and transport properties of solids, localization of states, magnetism, neutron and light scattering, phenomenological superconductivity, and other topics of current interest in condensed-matter physics.


646 High-Energy Particle Physics Spring. 3 credits. Lecs, T R 1:25–2:55. Staff.
Topics of current interest, such as high-energy electron and neutrino interactions, electron positron annihilation, and high-energy hadronic reactions, are surveyed. Lectures and reading material are at the level of Introduction to High Energy Physics, by Perkins.

Note: Only S-U grades will be given in courses numbered 650 or above.

651 Advanced Quantum Mechanics Fall. 3 credits. S-U grades only.
Lecs, M W F 10. H. Kawai. Relativistic quantum mechanics with emphasis on perturbation techniques. Extensive applications to quantum electrodynamics. Introduction to renormalization theory. At a level somewhat above that of Relativistic Quantum Mechanics, by Bjorken and Drell.

652 Quantum Field Theory Spring. 3 credits. S-U grades only.

653 Statistical Physics Fall. 3 credits. Normally taken by graduate students in their second or later years. Prerequisites: competence in the basic principles of quantum mechanics, statistical mechanics, and thermodynamics. S-U grades only.
Lecs, M W F 9:05. J. Wilkins. Survey of topics in modern statistical physics, including the theory of simple classical and quantum fluids, the theory of ordered systems such as superfluids and superconductors; kinetic theory and the Boltmann equation; phenomenological Fermi liquid theory and hydrodynamic theories of inhomogeneous systems; scaling theories and phase transitions. The contents of the course vary with the current interests of the instructor.

654 Theory of Many-Particle Systems Spring. 3 credits. Prerequisites: Physics 562, 574, 635, 636, and 653. S-U grades only.
Lecs, M W F 11–15. V. M. Ambegaokar. Equilibrium and transport properties of microscopic systems of many particles studied at zero and finite temperatures. Thermodynamic Green's function techniques introduced and applied to such topics as normal and superconducting Fermi systems, superfluidity, magnetism, insulating crystals.

661 High-Energy Phenomena Fall. 3 credits. Prerequisites: Physics 645, 646, and 651 (652 also desirable). S-U grades only.
Lecs, M W F 10. T. M. Yan. Field theoretic techniques used to study the strong and weak interactions of elementary particles are surveyed. Among these topics are path integrals, quantization of nonabelian gauge theories, renormalization group equations, applications of perturbative QCD, lattice field theory of chiral lagrangians, and the Standard Model of electroweak interactions. The relevance of these techniques and theories to experimental physics will be stressed.

[665 Topics in Theoretical Astrophysics (also Astronomy 555)] Fall. 4 credits. S-U grades only. Not offered 1987–88.
Lecs, M W F 2–30. E. Saltzberg. Usually concentrates on the theory of the interstellar medium. At the level of Spitzer's The Physical Processes in the Interstellar Medium.]

667 Theory of Stellar Structure and Evolution (also Astronomy 560) Fall. 4 credits. S-U grades only.
Lecs, M W F 1:25. E. Saltzberg. Summary of observational facts on stars; dimensional analysis; nuclear reactions and energy, transport in stellar interiors; models for static and evolving stars. At the level of Principles of Stellar Energy and Nucleosynthesis, by Clayton.

681–689 Special Topics
Offerings are announced each term. Typical topics are group theory, analyticity in particle physics, weak interactions, superfluids, stellar evolution, plasma physics, cosmic rays, general relativity, low temperature physics, X-ray spectroscopy or diffraction, magnetic resonance, phase transitions, and the renormalization group.

690 Independent Study in Physics Fall or spring. Variable credit. Students must advise department course coordinator of faculty member responsible for their project. S-U grades only.
Special graduate study in some branch of physics, either theoretical or experimental, under the direction of any professional member of the staff.

Portuguese
See Modern Languages, Literatures, and Linguistics.

Psychology


The major areas of psychology represented in the department are human experimental psychology, biopsychology, and personality and social psychology. These areas are very broadly defined, and the courses are quite diverse. Biopsychology includes such things as animal learning, neuropsychology, interactions between hormones, other biochemical processes, and behavior. Human experimental psychology includes such courses as cognition, perception, memory, and psycholinguistics. Personality and social psychology is represented by courses in social network theory as well as courses in social psychology and personality (such as theories of personality, beliefs and attitudes, and sex roles). In addition to the three major areas mentioned above, the department also emphasizes the statistical and logical analysis of psychological data and problems.

The Major
Prerequisites for admission to the major are:
1) any three courses in psychology (students often begin with Psychology 101);
2) no grade below C+ in any psychology course; and
3) acceptance by the Majors and Advising Committee of the Department of Psychology.
Application forms may be obtained at the department and should be filed two weeks before the pre-course enrollment period.

Requirements for the major are:
1) a total of 40 credits in psychology (including prerequisites), from which students majoring in psychology are expected to choose, with their advisers, a range of courses that covers the basic processes in psychology (laboratory and/or field experience is recommended); and
2) demonstration of proficiency in statistics before the beginning of the senior year. (See the section below on the statistics requirement.)

Normally it is expected that all undergraduate psychology majors will take at least one course in each of the following three areas of psychology:

1) Human experimental psychology
2) Biopsychology
3) Social, personality, and abnormal psychology

The following classification of Department of Psychology offerings is intended to help students and their advisers choose courses that will ensure that such breadth is achieved.

Human experimental psychology
Psychology 205, 209, 214, 216, 276, 305, 307, 309, 310, 313, 314, 316, 345, 412, 415, 416, 417, 418, 436, 492

Biopsychology
Psychology 223, 307, 322, 324, 326, 361, 369, 422, 425, 429, 492

Courses in the biopsychology area other than 123 all have 123 and/or introductory biology among their prerequisites.

Social, personality, and abnormal psychology

The major adviser determines to which group, if any, the following courses may be applied.

Other courses:

With the permission of the adviser, courses in other departments may be accepted toward the major requirements.

Fieldwork, independent study, and teaching.
The department requires students to observe the following limits of fieldwork, independent study, and teaching.
1) Undergraduates may not serve as teaching assistants for psychology courses if they are serving as teaching assistants for any other course during the same semester.
2) An undergraduate psychology major cannot apply more than 12 of the credits earned in independent study (including honors work) and fieldwork toward the 40 credits required by the major.

Statistics requirement.
Proficiency in statistics can be demonstrated in any one of the several ways listed below.

1) Passing Psychology 350.
2) Passing an approved course or course sequence in statistics in some other department at Cornell. The approved list of courses and sequences may change. It has usually included Education 352–353, Industrial and Labor Relations 210–311, and Sociology 301. An up-to-date list is posted outside of 278 Uris Hall. Requests that a particular course be added to this list may be made to Professor Gilovich for approval.
3) Passing a course or course sequence in statistics at some other college, university or college-level chemistry, physics, or mathematics. The course or course sequence must be equivalent to at least 6 semester credits. The description of the course from the college catalog and the title and author of the textbook used must be submitted to Professor Gilovich for approval.
4) Passing an exemption examination. This examination can be given at virtually any time during the academic year if the student gives notice at least one week before. Students who have completed a theoretical statistics course in a department of mathematics or engineering and who wish to demonstrate competence in applied statistics usually find this option the easiest. Students planning this option should discuss it in advance with Professor Gilovich. Sample examination questions are posted outside of 278 Uris Hall.

Concentration in biopsychology.
Psychology majors interested in psychology as a biological science can elect to specialize in biopsychology. Students in this concentration must meet all of the general requirements for the major in psychology and must also demonstrate a solid background in introductory biology; the physical sciences, including at least introductory chemistry and mathematics. Students will design with their advisers an integrated program in biopsychology built around...
courses on physiological, chemical, anatomical, and ecological determinants of human and nonhuman behavior offered by the Department of Psychology. Additional courses in psychology, anatomy, biochemistry, neuroscience, and developmentally designated as part of the psychology major after consultation between the student and his or her biopsychology adviser.

Concentration in personality and social psychology. This concentration is offered in cooperation with the Department of Sociology. Psychology majors who specialize in social psychology are expected to meet the general requirements set by their department, including statistics. To ensure a solid interdisciplinary grounding, students in the concentration will be permitted to include in the major courses in sociology and related fields. Advisers will assist students in the selection of a coherent set of courses from social organization, cultural anthropology, experimental psychology, social methodology, and several aspects of personality and social psychology. Seniors in the concentration may elect advanced and graduate seminars, with the permission of the instructor.

The undergraduate honors program. The honors program is designed for those exceptionally able students who wish to pursue an intensive and independent program of research in psychology. Successful participation in this program serves as evidence of the student's facility in the two most important skills of an academic psychologist: the capacity to acquire and integrate a substantial body of theoretical and factual material and the ability to engage in creative research activity. All qualified students planning on a graduate education in psychology or related fields should consider the honors program seriously. The program offers most students the closest contact and consultation with faculty that they will receive during their time at Cornell.

The core of the honors program is a research project the student carries out in close collaboration with a faculty member in the field of psychology. It is assumed that most students will do so while enrolled in Psychology 470 (Independent Study). A written report of the research is to be given to the chairperson of the honors committee (currently Professor Gilovich) by the last day of classes of the student’s senior year. An oral defense of the thesis is then given before a committee of three faculty members during the week before final examinations. Final honors standing (summa cum laude, magna cum laude, cum laude) is indicated on the student’s diploma. The T.A. Ryan award, accompanied by a cash prize, is awarded to the student who performs the best honors project in a given year.

A student may formally apply to the honors program at any time during the senior year, provided that she or he is actively engaged in independent research. However, it is expected that most students will do so by the end of the fall term so that they will be able to participate in a series of informal meetings during the spring semester in which the honors students get together to discuss their research projects. Applications should be given to Professor Gilovich and can be made by the student directly or by the student’s research adviser.

Distribution Requirement
The distribution requirement in the social sciences is satisfied by any two courses in psychology with the exception of Psychology 523, 301, 322, 324, 350, 361, 396, 425, 426, 427, 431, 471, 472, 473, 475, 476, 479, and 482.

Courses
101 Introduction to Psychology: The Frontiers of Psychological Inquiry Fall. 3 credits. Students may not receive credit for both Psychology 101 and Education 110. Students who would like to take a discussion seminar should also enroll in Psychology 103.


The study of human behavior. Topics include brain functioning and mind control, psychophysiology of sleep and dreaming, psychological testing, perception, learning, motivation, memory, language, motivation, personality, abnormal behavior, psychotherapy, social psychology, and other aspects of applied psychology. Emphasis is on developing skills to critically evaluate claims made about human behavior.

103 Introductory Psychology Seminars Fall. 1 credit. Limited to 400 students. Prerequisites: concurrent enrollment in Psychology 101. Hours to be arranged. 32 different time options. Staff. A weekly seminar that may be taken in addition to Psychology 101 to provide an in-depth exploration of selected areas in the field of psychology. Invokes extensive discussion and a term paper related to the seminar topic. Choice of seminar topics and meeting times will be available at the second lecture of Psychology 101.

205 Perception Spring. 3 credits. Open to first-year students.


One of four introductory courses in cognitive psychology. Basic perceptual concepts and phenomena are discussed with emphasis on stimulus variables and sensory mechanisms. All sensory modalities are considered. Visual and auditory perception are discussed in detail.

209 Development Spring. 4 credits.

T R 11:25–12:40; sec, to be arranged. F. Keil.

One of four introductory courses in cognitive psychology. A comprehensive introduction to current thinking and research in developmental psychology. The course focuses on development of action, development of perception and knowledge, development of language, memory, and other aspects of human culture, and development of emotional and social relationships.

214 Knowledge and Reasoning Spring. 3 credits.

M W F 1:25–2:40. Staff.

One of four introductory courses in cognitive psychology. A survey of the following topics: visual and auditory memory, imagery, attention, memory for language, reasoning, decision making, and intelligence.

215 Psycholinguistics Fall. 3 or 4 credits (4-credit option involves term paper).


One of four introductory courses in cognitive psychology. Introduction to the psychological study of language. Covers basic linguistic theory and contemporary research into language comprehension, production, and acquisition.

265 Psychology and Law Fall. 3 credits.

Prerequisite: Psychology 101.

M W F 1:25. D. Dunningsh.

This course examines the implications of psychological theory and methods for law and the criminal justice system. We will concentrate on psychological research on legal topics (e.g., confession, eyewitness testimony, jury decision making, homicide, aggression, the prison system), social issues (e.g., death penalty, affirmative action), and issues related to scientific method and research in the legal system (e.g., assessing insanity and dangerousness and for expert testimony).

275 Introduction to Personality Psychology Fall. 3 or 4 credits; the additional (or fourth) credit is given for attendance at the optional section meeting and a term paper. Prerequisite: an introductory psychology course.

T R 10:10–11:25. Sec to be arranged. Staff.

An introduction to research and theory in personality psychology, emphasizing contemporary approaches. Topics include the dynamics, structure, and assessment of personality as well as personality development and change. Biological and sociocultural influences on personality are also considered.

276 Motivation Theory: Contemporary Approaches and Applications Spring. 4 credits.


M W F 11:15. Staff.

Models and research in human motivation are examined and integrated. Traditional approaches are used as departure points for the study of more current themes such as intrinsic motivation and achievement motivation. Attention is given to how pertinent various themes are to real-life behavioral settings.

277 Psychology of Sex Roles (also Women’s Studies 277 and Sociology 277) Spring. 3 or 4 credits; the additional (or fourth) credit is given for an optional empirical research project. Limited to 200 students.

Prerequisite: an introductory psychology course.


The course addresses the question of why and how adult women and men come to differ in their overall lifestyle, work and family roles, personality patterns, cognitive abilities, etc. This broad question is examined from five perspectives: (a) the psychoanalytic perspective, (b) the Freudian Freudian perspective, (c) the historical and cultural evolutionary perspective, (d) the child development perspective, and (e) the social-pastological and contemporary perspective. Each of these perspectives is also brought to bear on more specialized areas of specialization relating to the psychology of sex roles, including psychological androgyny, women’s conflict over achievement, the male sex role, equalitarian marriage relationships, gender-liberated child-rearing, female sexuality, homosexuality, and transsexualism.

280 Introduction to Social Psychology Spring. 3 or 4 credits; the additional (or fourth) credit is given for the completion of a group research project and write-up. Prerequisite: an introductory psychology course.


An introduction to research and theory in social psychology. Topics include processing of social information; social influence, persuasion, and attitude change; social interaction and group phenomena. The application of sociopsychological knowledge to current events will also be discussed.

305 Visual Perception Fall. 4 credits. Limited to 20 students.

Prerequisite: Psychology 265 or permission of instructor.


A detailed examination of theories and processes in visual perception. Topics include the perception of color, form, and motion; perceptual constancies; adaptation; pattern perception; and photography, television, and film.
[307 Chemosensory Perception] Fall. 3 or 4 credits; the optional (or fourth) credit is for an independent laboratory project. Registration for the 4-credit option requires permission of the instructor; students will read, analyze, and discuss difficult original literature in the areas covered. Offered alternate years. Not offered 1987–88; next offered fall 1988.

T R 9:05. B. P. Hatpirn.


[308 Perceptual Learning] Fall. 3 credits. Prerequisite: Psychology 205, 209, or 305, or permission of instructor. Not offered 1987–88.

[309 Development of Perception] Fall. 3 credits. Prerequisite: Psychology 205, 209, 214, or 305, or permission of instructor. T R 9:25–11:45. E. Spelke.

An introduction to theories and research on the origins and development of perceptual knowledge. The course focuses on perception of the world as an arrangement in space and time, perception of the world as a unit that can be encountered through multiple sensory modes, perception of the world as a meaningful place that can be acted upon, and organization of the world into objects and events.

[310 The Psychology of Reading] Spring. 4 credits. Prerequisites: either Psychology 206, 214, 215, or 305, or permission of instructor. Not offered 1987–88.

The course will introduce the major areas of psycholinguistic investigation: an introduction to the major areas of psychological and neurolinguistic processes used in reading.

[313 Perceptual and Cognitive Processes] Spring. 4 credits. Prerequisite: Psychology 206 or 214 or permission by instructor. R 1:25–4:25. J. Smith.

A critical examination of selected topics in the area of perceptual and higher mental processes. We will read, discuss, and analyze original experimental research reports and theoretical articles.

[314 The Social Psychology of Language] Spring. 4 credits. Prerequisite: a course in psycholinguistics or social or personality psychology, or permission of instructor.


We are aware that one talks differently to children than to adults, to foreigners than to native speakers, to people like us than to those we detest, to people whose influence we respect compared to those we think are idiots. Socially significant speech varies with both social relationships and sometimes with the relationship of the speaker to the listener. The latter may be due to social status, gender, or group membership. In this course, we will explore the variety of ways in which we communicate with others and the effects of our communication on others. We will also consider how we can improve our communication skills.

[315 Auditory Perception] Spring. 3 or 4 credits; the 4-credit option involves a laboratory project or paper.

Prerequisite: Psychology 205, 209, 214, or 215 (other psychology, linguistics, or biology courses could serve as a substitute; permission of instructor). Not offered 1987–88. Lec., T R 2:30–4:25; lab, hours to be arranged. Staff.

Basic approaches to the perception of auditory information, with special consideration of complex patterns such as speech, music, and environmental sounds.

[322 Hormones and Behavior (also Biological Sciences 322)] Spring. 3 or 4 credits; the 4-credit option involves a one-hour session once a week, in which students will be expected to participate in discussions and read original papers in the field. Limited to juniors and seniors; open to sophomores only by permission. Prerequisite: one year of introductory biology plus a course in psychology or Biological Sciences 221 or 222. S-U grades optional.

The relationship between endocrine and neuroendocrine systems and the behavior of animals, including humans. Major emphasis is on sexual, parental, and aggressive behavior.

[324 Biopsychology Laboratory (also Biological Sciences 324)] Fall. 4 credits. Limited to 25 juniors and seniors. Prerequisite: Psychology 123 or Biological Sciences 221 or 222, and permission of instructor: S-U grades optional.


Experiments designed to provide research experience in animal behavior (including learning) and its neural and hormonal mechanisms. A variety of techniques, species, and behavior patterns are included.

[325 Introductory Psychopathology] Fall. 3 or 4 credits; the 3-credit option entails lectures, readings, and two exams; the 4-credit option requires an additional seminar-lecture per week and a term paper. Prerequisite: a course in introductory psychology. May be taken concurrently with Psychology 327 (for 3 credits in 325 and 2 credits in 327) with permission of instructor. Enrollment in Psychology 327 is limited.


A survey of the various forms of psychopathology, child and adult, as they relate to the experiences of human growth and development. Presents a description of the major syndromes, investigations, theories of etiology, and approaches to treatment.

[326 Evolution of Human Behavior] Fall. 4 credits. Prerequisite: Psychology 123, an introductory biology course or an introductory anthropology course.

Fall. 4 credits.


A broad comparative approach to the behavior of animals and humans, with special emphasis on human evolution and the evolution of human behavior. Topics may include courtship and mating systems, aggression and terror, communication, language, and cognitive functions. Sociobiological theories of human nature and evolution will be discussed and evaluated.

[327 Fieldwork in Psychopathology and the Helping Relationship] Fall. 2 credits. Prerequisite: Psychology 325 or concurrent registration in 325 and permission of instructor. S-U grades only. Students do not enroll in advance for this course. Field placement assignments are made in Psychology 325 during the first two weeks of the semester. Students who have not yet taken Psychology 325 must contact the instructor during the first week of the semester. Enrollment is limited by the fieldwork placements available. Fee, $25.

Hours to be arranged, K. Keil.

An introductory fieldwork course for students currently enrolled in, or who have taken Psychology 325. Fieldwork placements include the school system, psychiatric inpatient and outpatient facilities, and other mental health–oriented facilities. In addition to fieldwork, weekly supervisory/seminal meetings are held to discuss fieldwork issues and assigned readings.

[328 Continuing Fieldwork in Psychopathology and the Helping Relationship] Fall or spring. 2 credits each term. Prerequisites: Psychology 325, 327, and permission of instructor. S-U grades only. May not be taken more than twice. Students do not enroll in advance for this course. Students in Psychology 327 should inform their teaching assistant before the end of the semester of their desire to take Psychology 328. Students not currently in a field placement who want to take Psychology 328 should contact the instructor during the first week of the semester. Field placement assignments will be made during the first two weeks of the semester. Enrollment is limited by the fieldwork placements available. Fee, $25.

Fieldwork and supervisory times to be arranged. K. Keil and staff.

Designed to allow students who have begun fieldwork as part of Psychology 327 to continue their fieldwork. Open only to those with permission of the instructor.

[329 Biopsychology of Learning and Memory] Spring. 3 credits. Prerequisites: one year of biology and either a biopsychology class or Biological Sciences 222.

M W F 11:5 T. DeVoogd.

This course will survey the approaches that have been or are currently being used in order to understand the biological bases for learning and memory. Topics will include invertebrate, "simple system" approaches, imprinting, avian song learning, hippocampal and cerebellar function, and human pathology. Many of the readings will be from primary literature.

[345 Psychological Research and Afro-Americans (also Africana Studies 345)] Fall. 4 credits.

Prerequisite: one course in introductory psychology or Africana Studies and Research Center 171.


In this course we will examine psychological research that has had implications for Africana Studies. The issues to be explored include (1) research methods, (2) racial attitudes within and between groups, (3) measures of group differences, (4) cognitive abilities, and (5) motivational issues. Course requirements include a preliminary exam, a midterm paper, and a final project.


T 10:10–12:05; lab to be arranged. J. Maas.

An exploration of theories of perception, attitude, and behavior as they change as they relate to the effectiveness of visually based communication systems. Emphasis is on an empirical examination of the factors that determine the nature and effectiveness of pictorial representations of educational messages in non-print media.

[350 Statistics and Research Design] Fall. 4 credits. Prerequisite: a course in the behavioral sciences.


Acquaints the student with the elements of statistical description (measures of average, variation, correlation, etc.) and, more importantly, develops an understanding of statistical inference. Emphasis is placed on those statistical methods of principal relevance to psychology and related social sciences.

[361 Biochemistry and Human Behavior (also Nutritional Sciences 361)] Fall. 3 credits.

Prerequisites: Biological Sciences 101 – 102, Chemistry 103 – 104, Psychology 233, or permission of instructor. S-U grades optional.

M W F 11:15. D. Levitsky.

The course is intended to survey the scientific literature on the role of the brain and body biochemically changes as determinants of human behavior. The topics covered include action and effects of psychopharmacologic agents, biochemical determinants of mental retardation, biochemical theories of psychosis, and effects of nutrition on behavior. A fundamental knowledge of human biology and chemistry is essential.
379 Social Cognition
Spring. 4 credits. Prerequisite: one course in social or cognitive psychology or permission of instructor.
The focus of this course is on experimental research that applies cognitive principles to the study of social psychological phenomena. The course begins with an overview of research methodology (no prior knowledge in this area is required). Readings and discussion center around the following topics: (1) the organization and representation of social information; (2) assessing the causes of social behavior; and (3) sources of error and bias in human judgment. Course requirements include a midterm exam, a final project, and a final paper.

[383 Social Interaction (also Sociology 383)]
Spring. 4 credits. Prerequisite: a course in social psychology. Not offered 1987–88.
Fine-grain analyses of social behavior, its structure, changes, and determinants. Extensive practice in analysis of filmed and taped interactions. Student research is required throughout the course.

384 Cross-Cultural Psychology (also Sociology 384)
Spring. 4 credits. Prerequisite: a course in psychology and one in either sociology or social or cultural anthropology, or permission of instructor.
An introduction to cross-cultural psychological approaches, methods, discoveries, and applications in emerging attempts to study human nature, experience, and behavior cross-culturally. Focus on studies of cognition, values, socialization, sex roles, values, attitudes, stereotypes, knowledge, ideology, sociocultural development, and mental illness. Problems of how one can learn another culture will also be dealt with.

385 Theories of Personality (also Sociology 385)
Fall. 4 credits. Prerequisite: Psychology 101, 214, or 275, or permission of instructor.
An intermediate analysis of comparative features of the historically and currently important theories of personality, with an evaluation of their systematic empirical contribution to modern personality study, to psychology, and to other behavioral sciences.

[387 Health and Disease (also Biology and Society 327 and German Literature 327)]
Fall. 4 credits. Prerequisite: Psychology 101, 214, or 275, or permission of instructor. Not offered 1987–88.
Hours to be arranged. S. L. Gilman and faculty team.
Everyone knows what health and disease are. Do or they? This Common Learning course on health and disease will explore some of the cultural, psychological, philosophical, anthropological, medical, economic, and political dimensions of these concepts to show how various models of disease function in contexts from business to engineering, from the military to the medical profession. The course will be divided into two segments: the first will examine the general implications of concepts of health and illness; the second will study these general principles as reflected in the definition, treatment, and mythmaking surrounding one specific disease: schizophrenia. The course will draw on specialists from throughout the University.

[396 Introduction to Sensory Systems (also Biological Sciences 396)]
Spring. 3 or 4 credits (4 credits with term paper). Registration for the 4-credit option requires permission of instructor. Prerequisite: an introductory course in biology or biopsychology, plus a second course in neurobiography or behavior or perception or cognition or biopsychology. Students will be expected to have some background in psychology or cognitive psychology, and some training in physics, physiology, or physiology, behavior, and chemistry. S-U grades optional for graduate students only. No auditors. Offered alternate years. Not offered 1987–88; next offered 1989–90.
M W F 9:05. B. P. Halpern.
The course will be taught using the Socratic method, in which the instructor asks questions of the students. Students read, analyze, and discuss in class difficult original literature dealing with both those characteristics of sensory systems which are common across living organisms, and those sensory properties which represent adaptations of animals to particular habitats or environments. The principles and limitations of major methods used to examine sensory systems will be considered. General principles of sensory systems, and auditory, visual, and somesthetic systems are covered. One aspect of each system (e.g., localization of objects in space by sound, color vision, thermoreception) will be selected for special attention. At the level of an Introduction to the Physiology of Hearing, by J. O. Pickles; Photoreceptors: Their Role in Vision, by A. Fein and E. Z. Szuts; Comparative Studies of Hearing in Vertebrates, edited by A. N. Popper and R. R. Fay, and "Information Processing in Cutaneous Mechanoreceptors," Fed. Proc., 42. 1983.

402 Current Research on Psychopathology
Fall. 4 credits. Prerequisite: Psychology 325. Not offered 1987–88.
TR 10:10–11:20; sec to be arranged. K. Keil.
Current research and theory on the nature and etiology of major psychiatric disorders and psychopathy. Approaches from various disciplines are considered. Minimal attention to psychotherapy.

404 Psychopathology and the Family
Spring. 4 credits. Limited to 25 students. Prerequisite: Psychology 325.
This course will explore familial influences on the development of abnormal behavior. It will examine how psychological, biological, and cultural factors within a family might contribute to such disorders as anorexia nervosa, depression, sexual abuse, psychopathy, and psychosomatic illnesses. Emphasis will be placed on early childhood experiences within the family and how this impacts on the development of later psychopathology. The course will also discuss how the evolution of family structures in more recent times (e.g., the rise in day care and divorce) influences the individual family therapy approaches and techniques.

410 Undergraduate Seminar in Psychology
Fall or spring. 2 credits. Written permission of section instructor required for registration. Nonmajors may be admitted, but psychology majors are given priority. Hours to be arranged. S. L. Gilman and faculty team.
Information on specific sections for each term, including instructor, prerequisites, and time and place, may be obtained from the Department of Psychology office, 211 Uris Hall.

412 Human Experimental Psychology Laboratory
Spring. 4 credits. Limited to 15 students. Prerequisite: permission of instructor. Recommended: knowledge of some high-level programming language, at least one course in human experimental psychology, or graduate standing in psychology.
TR 1:25–2:40; lab to be arranged. J. Freyd.
A laboratory course in current methods of experimentation in perception and cognitive psychology that will focus on the use of microcomputers in laboratory research for both stimulus presentation and data collection. Students will hand in written laboratory reports. Projects will be selected from the areas of visual perception, pattern recognition, reading, memory, language, and concept learning.

415 Concepts, Categories, and Word Meanings
Fall. 4 credits. Prerequisite: Psychology 205; 209, 214 or 215 or permission of instructor.
W 2–5. F. Keil.
Several different psychological theories about concepts, categories, and word meaning are considered. Topics will include models of concepts and categorization processes, conceptual change in development and in novice-expert transitions, relations between semantic and conceptual structure, and relations between concepts and intuitive theories of the world.

416 Psychology of Language
Spring. 4 credits. Prerequisite: some background in psycholinguistics or linguistics.
Each year the course focuses on one or two major theoretical issues in current psycholinguistics. An intensive critical examination is made of the relevant literature from psychology, linguistics, and artificial intelligence. The issues are considered not only at the detailed level of specific hypotheses and evidence but also in relation to broader theoretical trends in the field. See the professor for further information on topics for 1987–88.

417 The Origins of Thought and Knowledge
Spring. 4 credits. Prerequisites: Psychology 205, 209, 214 or 215 or permission of instructor. Not offered 1987–88.
T 1:25–4:05. F. Keil.
An in-depth analysis of current theories concerning the growth of thought and knowledge in childhood. Several controversies will be discussed in detail, including: Are mental abilities organized in local domains or modules that have their own patterns of development, or is cognitive development a more general process? Do comparative studies with other species and evolutionary models make any useful insights into cognitive development in humans? Are there qualitative restructurings of thought and knowledge with development, or is the process more continuous in nature? What restrictions should these developmental considerations place on models of thought and knowledge in adults?

418 Psychology of Music
Fall. 3 or 4 credits, depending on whether student elects to do an independent project. Prerequisite: junior or senior standing with major in psychology or music and some background in both, or permission of instructor. Not offered 1987–88.
Detailed analysis of topics in the psychology of music, including theories of consonance, perception of tonal-harmonic structure, memory for music, and effects of musical training. Emphasis given to experimental methodologies.

422 Developmental Biopsychology
Fall. 4 credits. Prerequisite: a course in introductory biology and a course in biology or biopsychology (such as Psychology 123 or Biological Sciences 221).
M W F 9:05. B. Finlay.
We will discuss the relationship of the development and evolution of the brain to the development of behavior. Topics include normal neuroembryology; how neurons are formed; how axons develop; the establishment of connections; the emergence of reflexive and complex behavior; how experience affects the developing brain; evolutionary perspectives on the development of perception, memory, and communication systems, and abnormal development.

425 Brain and Behavior
Fall. 3 or 4 credits (4-credit option includes a discussion section and requires an additional paper). Prerequisite: a course in introductory biology and a course in biopsychology or neurobiology (such as Psychology 123 or Biological Sciences 221). Not offered 1987–88; next offered 1988–89.
M W F 9:05. B. Finlay.
We will study the relation between structure and function in the central nervous system. Human neuropsychology and the contribution of work in animal nervous systems to the understanding of the human nervous system will be stressed. Some topics to be covered include the roles of different brain regions in perception, organization of motor activity, emotion and motivation, psychosurgery, and memory and language.

426 Seminar and Practicum in Psychopathology
Spring. 4 credits. Limited to 16 students. Prerequisite: Psychology 325, permission of instructor required in all cases. Students should apply to the course during
preregistration in fall semester; acceptance will be announced before the end of the fall semester. Not offered 1987–88.


A seminar and practicum course for advanced students who have mastered the fundamental concepts of personality and psychopathology. An opportunity to explore in depth issues in personality and psychopathology, particularly as they relate to issues of development, fantasy, attachment, and sex roles. Includes an experimental component involving self-disclosure, peer counseling, and group process. The goal: an integration of education and personal growth. It is recommended that students take Psychology 328, the fieldwork course, in conjunction with this seminar.

[429 Olfaction and Taste: Structure and Function (also Biological Sciences 429)] Fall. 3 or 4 credits. (4-credit option requires a term paper or research project). Preference given to junior and senior psychology and biology majors and graduate students.

Prerequisite: One 300-level course in biopsychology or equivalent. Not offered 1987–88.

T R 9:05. B. P Halpern.

The structural and functional characteristics of olfaction and taste will be explored by reading and discussing current literature in these areas. Structure will be examined at the light and electron microscope levels as well as at the molecular level. Function will be primarily neurophysiological and biochemical aspects. The emphasis will be on vertebrates, especially air-breathing vertebrates in the case of olfaction, but there will be some coverage of invertebrate forms.

436 Language Development (also Human Development and Family Studies 436 and Linguistics 436) Spring. 4 credits. Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, or linguistics. S-U grades optional. Offered alternate years.

T R 10:10–11:25; disc. 11:30–12:05. B. Lust.

A survey of current research and theory concerning first-language acquisition. Major theoretical positions in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental linguistic and the biological foundations for acquisition are discussed, as are the issues of relations between language and thought. The acquisition of communication systems in nonhuman species such as chimpanzees are addressed, but major emphasis is on the child.

[440 Sleep and Dreaming Spring. 4 credits. Limited to 15 students. Prerequisites: advanced undergraduate or graduate standing and permission of instructor. Not offered 1987–88. J. Maas.]

[450 Seminar in the Psychology of Gender (also Women's Studies 450) Fall. 4 credits. Prerequisite: Psychology 277 and permission of instructor. Not offered 1987–88.]


This seminar is designed primarily for advanced psychology students in whose research and interest areas have a strong interest in empirical research. Each time the course is offered, a particular research topic will be selected and announced at the first meeting of the course. All interested students should attend that meeting.

[467 Seminar: The Examined Self—A Psychobiographical View Spring. 4 credits. Prerequisites: Psychology 325 or equivalent, and permission of instructor before course enrollment. Not offered 1987–88.]


Based primarily on American autobiographies dating from the seventeenth century to the twentieth century, this seminar will explore the shifting interface between self and historical context. Students should be prepared to write and talk about their own lives as well as the historical figures selected for study.

468 American Madness Spring. 4 credits. Limited to 15 students.

Prerequisites: Psychology 325 and permission of instructor.


The seminar will be devoted to an analysis of insanity as a psychological and historical phenomenon. Selected writings by the mentally ill and their definers will be studied.

469 Psychotherapy: Its Nature and Influence Spring. 4 credits. Limited to senior psychology majors.

Prerequisites: Psychology 325 or equivalent and permission of instructor.

W 7:30–10:30 p.m. R. Mack.

A seminar on the nature of psychotherapy. Issues related to therapeutic goals, differing views of the nature of the therapeutic relationship and its problems are also considered. Presentations by therapists of differing orientations and experiential and role-play exercises are an integral part of the seminar experience.

470 Undergraduate Research in Psychology Fall or spring. 1–4 credits. S-U grades optional. Written permission from the staff member who will supervise the work and assign the grade must be included with the course enrollment material. Students should enroll in the section listed for that staff member. A section list is available from the Department of Psychology.

Spring. Hours to be arranged.

Practique in planning, conducting, and reporting independent laboratory, field, and/or library research.

[471 Statistical Methods in Psychology I Fall. 4 credits. Not offered 1987–88.]

M W F 11:15. Staff.

Basic probability, descriptive and inferential statistics. Topics include parametric and nonparametric tests of significance, Bayesian inference, correlation, and simple linear regression. The level of the course is that of W. L. Hays, Statistics for Psychologists.

[472 Multiple Regression Spring. weeks 1–7 2 credits. Prerequisite: one semester of introductory statistics. Analysis of variance is helpful but not required.


Uses and pitfalls of multiple regression in causal analysis, path analysis, and prediction. Emphasis on analyzing data collected under controlled or experimental conditions. Includes collinearity, t-residuals, indicator or dummy variables, hierarchical analysis, specification errors, measurement errors, binary hand computation, uses SAS PROC REG computer program.

473 General Linear Model Spring, weeks 8–14. 2 credits. Prerequisite: Psychology 472 or equivalent.


Use of regression and the general linear model for analyzing experimental and nonexperimental data. Includes random assignment, sets of variables, multivariate analyses, and nonparametric methods for handling nonnormal data. All topics are discussed at the level of the course. Includes SAS PROC GLM.

[475 Multivariate Analysis of Psychological Data Fall. 2 credits. Prerequisite: Psychology 472 or permission of instructor. Not offered 1987–88; next offered 1988–89.


Most of the course concerns relative advantages of factor analysis and newer competing techniques for discovering hidden patterns in correlational data. Uses SAS PROC FACTOR and PROC PRINCOMP. Also includes brief discussions of MANOVA, discriminant analysis, canonical correlation analysis, canonical reduction analysis, and multidimensional scaling.]

[476 Representation of Structure in Data Fall. 3 credits. Prerequisite: one year of college mathematics (finite mathematics or calculus) and a course in the social sciences. Not offered 1987–88.

T 2:30–4:30. Staff.

Representations of preferences, dominance data, psychological distances, and similarities will be discussed. Topics include unidimensional and multidimensional scaling, unfolding, individual differences scaling, hierarchical clustering, and graph-theoretic analysis.

478 Psychometric Theory Fall, weeks 1–10. 3 credits.

Prerequisite: Psychology 473 or permission of instructor.


Statistical methods relevant to the use, construction, and evaluation of psychological tests.

[479 Multisample Secondary Analysis Fall, weeks 11–14. 1 credit. Prerequisite: Psychology 350 or equivalent.


Statistical methods for analyzing and integrating the results of many independent studies on related topics.

481 Experimental Social Psychology Fall. 4 credits. Limited to 20 students.

Prerequisite: a course in social psychology or permission of instructor.


Selected topics in social psychology are examined in depth with an emphasis on the relationship between experimental research and the development of theory. Readings will be primarily primary sources. Among the theoretical approaches to social behavior we may discuss are social comparison theory, cognitive dissonance, attribution processes and social judgment, social exchange theory, and biological perspectives.

482 Death and Dying Spring. 4 credits. Limited to 20 juniors and seniors.

Prerequisites: 6 credits in sociology or psychology.


Issues of death and dying in modern American society are explored from the perspectives of psychology, sociology, and the health-related professions. Possible inadequacies in current practice are examined and alternatives discussed.

[484 The Social Psychology of Close Relationships Fall. 4 credits. Limited to 15 students.

Prerequisite: a course in social psychology and a course in statistics and permission of instructor (by application). Not offered 1987–88.


A seminar in which there will be intensive class discussion of topics such as how to analyze close relationships; development and change over time; the roles of emotion, power, love, commitment, exchange, and interpersonal; and nonresearch methods for studying close relationships. Students will individually generate hypotheses about aspects of relationships and develop research strategies for testing them.]

[485 Human Development in Post-industrialized Societies (also Human Development and Family Studies 485) Spring. 4 credits. Limited to 20 juniors and seniors.

Prerequisite: Common Learning Curve.

T R 2:30–4:25. U. Bronfenbrenner and faculty team.

The course analyzes the implications for human development of the profound economic, technological, and social changes that have been taking place in modern societies. Particular emphasis is placed on the effect of these changes on the family, the school, the
workplace, and the relations between these domains as they influence the development of intellectual and social competence in adulthood. The topic will be treated from the perspective of several relevant disciplines, including economics (Robert H. Frank), developmental psychology (Stephen Ceci), social anthropology (Robert J. Smith), human biology (Virginia Utermohlen), sociology (Philip M. Moen), and American and European history (John Weiss). This is one of a series of Common Learning Courses specially designed to contribute to general education at the upperclass level. Each course focuses on a topic of significance to contemporary society and has been developed by a faculty team from different disciplines, with one instructor taking primary responsibility for the integration and teaching of the course.

[486] Interpersonal and Social Stress and Coping (also Sociology 486) Fall. 4 credits. Limited to 25 upperclass students. Prerequisites: background in psychology and introductory statistics, or permission of instructor. Not offered 1987–88. T 2:30–4:25. W. L. Lambert. A critical review of work in interpersonal, intergroup, situational, and sociocultural sources of stress and the major psychophysiological concomitants of such stress; resultant coping strategies and aids to coping. Data from laboratory, industry, and other cultures will be analyzed.

486 Development in Context (also Human Development and Family Studies 486) Fall. 4 credits. Prerequisites: upperclass majors in human development or psychology, and one course in statistics, or permission of instructor. T R 2:30–4:25. U. Bronfenbrenner. The course presents a review and integration of existing knowledge about human development over the life course as a function of interaction between the changing properties of the person and of the place and time in which the person lives. Developmental effects are examined in terms of the interplay of intellectual, social, and emotional processes in an integrated organism.

489 Seminar: Selected Topics in Social Psychology and Personality (also Sociology 489) Spring. 4 credits. Prerequisites: one course in psychology and one course in sociology or permission of instructor. Hours to be arranged. Staff. The specific topics of discussion vary, but the general emphasis is on a critical examination of the study of individuals in social contexts.

490 History and Systems of Psychology Fall. 4 credits. Intended for juniors, seniors, and graduate students, majors and nonmajors. Prerequisites: at least three courses in psychology or related fields or permission of instructor. Not offered 1987–88. M W F 2:30. H. Levin. The course aims to acquaint students with the recent history of psychology and to help them to identify important trends and underlying assumptions in contemporary writings. After a discussion of relevant nineteenth-century developments, a number of the major historical systems will be surveyed: the introspectionist, functionalist, behaviorist, and Gestalt psychologies, psychoanalysis, and cognitive psychology. Emphasis will be on the ideas that have shaped modern psychology.

492 Sensory Function (also Biological Sciences 492) Spring. 4 credits. Prerequisites: A 300-level course in biopsychology, or Biological Sciences 222 or 311, or permission of the instructor. Students are expected to have a knowledge of elementary physics, chemistry, and behavior. S-U grades optional. Offered alternate years. Not offered 1987–88; next offered 1989–90. M W F 10:10–12. H. C. Howland, B. P. Halpern. This course covers classical topics in sensory function such as vision, hearing, touch and balance, as well as some more modern topics like sensory coding, location of stimulus sources in space, and the development of sensory systems. Both human and nonhuman systems are discussed. In all cases the chemical, physical, and neuropsychological bases of sensory information are treated, and the processing of this information is followed into the central nervous system. At the level of The Senses, edited by Barlow and Molton, and Sense Organs, edited by M. S. Laverack and D. J. Cosens.

Advanced Courses and Seminars

Advanced seminars are primarily for graduate students, but with the permission of the instructor they may be taken by qualified undergraduates. The selection of seminars to be offered each term is determined by the needs of the students. A supplement describing these advanced seminars is available at the beginning of each semester and can be obtained from the department office. The following courses may be offered either term and carry 4 credits unless otherwise indicated.

502 Professional Writing in Psychology
510–511 Perception
512–514 Visual Perception
513 Learning
515 Motivation
517 Language and Thinking
518 Psycholinguistics
519–520 Cognition
521 Psychobiology
522 Topics in Perception and Cognition
523 Physiological Psychology
524 Sex Differences in Brain and Behavior (also Biological Sciences 524) Spring. 2 credits. Limited to 12 seniors and graduate students. Hours to be arranged. T. DeVoogd. A survey of the newly discovered animal models for sex differences in the brain. Topics include the role of steroids in brain development, whether hormones can modify the structure of the adult brain, and the consequences of such sex differences in anatomy for behavior.

525 Mathematical Psychology
531 History of Psychology
535 Animal Behavior
541 Statistical Methods
543 Psychological Tests
544 Topics in Psychopathology and Personality
545 Methods in Social Psychology
547 Methods of Child Study
551 Distinguished Speakers
561 Human Development and Behavior
580 Experimental Social Psychology (also Sociology 580)
591 Educational Psychology
595 Teaching of Psychology
596 Improvement of College Teaching

600 General Research Seminar No credit.

[513] Obesity and the Regulation of Body Weight (also Nutritional Sciences 613) Spring. 3 credits. Prerequisites: one course in psychology and one course in nutrition. Undergraduate students may register with permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88.

T R 1:30–3. D. Levitsky. This course is a multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, the genetics of obesity, the role of activity and energy metabolism, psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination.

683 Seminar in Interaction (also Sociology 683)


690 Seminar on Nutrition and Behavior (also Nutritional Sciences 690) Spring. 3 credits. Prerequisites: a course in psychology, Nutritional Sciences 361, and permission of instructor. S-U grades optional. Offered alternate years. T R 1:30–3. D. Levitsky. The seminar this year covers several current topics in nutrition and behavior. These topics include early nutritional insult and mental development, nutrition and behavior, nutrition and learning, food adductives and hyperkinesis, megavitamin therapy, inborn metabolic defects and mental illness, nutrition and depression, and hypoglycemia.

700 Research in Biopsychology

710 Research in Human Experimental Psychology

720 Research in Social Psychology and Personality

730 Research in Clinical Neuropsychology Limited to Clinical Neuropsychology Program trainees.

900 Doctoral Thesis Research in Biopsychology

910 Doctoral Thesis Research in Human Experimental Psychology

920 Doctoral Thesis Research in Social Psychology and Personality


Summer Session Courses

The following courses are also frequently offered in the summer session, though not necessarily by the same instructor as during the academic year. Not all of these courses will be offered in a particular summer. Information regarding these courses and additional summer session offerings in psychology is available from the department before the end of the fall semester.

101 Introduction to Psychology: The Frontiers of Psychological Inquiry

123 Introduction to Biopsychology

124 Introduction to Psychology: The Cognitive Approach

128 Introduction to Psychology: Personality and Social Behavior

195 Art and Psychology

209 Developmental Psychology
Sinhala
See Modern Languages, Literatures, and Linguistics.

Sociology


Sociology is concerned with the way individuals are organized into groups, networks, classes, institutions, and communities. Its specialties include analyses of social conflict and accommodation, population trends, organizational and institutional change, influence and power, the family, law, religion, medicine, and science. All public policy, local or national, is affected by these sociological issues.

The Department of Sociology offers the opportunity to develop fundamental theoretical insight and practical research skills appropriate for the study of social life. Graduates of the department take up careers in university, government, and private settings and in law, business, applied engineering, public policy planning, architecture, education, and other professions seeking understanding of society and social issues.

The Department of Sociology has particular strengths in (a) research methods, (b) institutions and organizations, (c) cross-cultural comparisons, (d) social psychology, (e) population studies, and (f) public policy analysis.

Related Courses in Other Departments

Students interested in sociology should also consult the lists of the following departments: Organizational Behavior (College of Industrial and Labor Relations), Human Development and Family Studies (College of Human Ecology), and Rural Sociology (College of Agriculture and Life Sciences). A comprehensive list of all sociology courses offered throughout the university may be found opposite the elevators on the third floor of Ursinus Hall.

The Major

There are three options for sociology majors: general sociology, social relations, and honors sociology.

Requirements for general sociology: (1) Any two introductory courses with a 2.5 minimum grade-point average (students are advised to take Sociology 101 and either 103 or 105); (2) no later than the junior year, the 301--302--303 methods courses; (3) one course in the department at the 400 level or higher; and (4) 20 additional credits in sociology, of which 9 may be taken in related departments if approved by the student's adviser.

Requirements for social relations: This major is offered jointly by the Departments of Anthropology and Sociology. See page 231 for a description and a list of requirements.

Requirements for honors in sociology: (1) Any introductory course; (2) no later than the junior year, the Sociology 301--302--303 methods and statistics courses and at least 2 credits of 491, Independent Study. (potential honor students are encouraged to begin taking the methods and statistics courses during their sophomore year); (3) during the senior year, 495--496 and one additional 400-level or higher-level course; (4) 12 additional credits in sociology of which 9 may be taken in courses offered by related departments if approved by the student's adviser. Graduation with honors requires a cumulative average of at least B+ in all sociology courses.

Requirements for all majors: More-advanced methods courses may be substituted for Sociology 301, 302, or 303. Other exceptions or substitutions require the approval of the student's adviser. Students may concentrate their electives in a single subfield such as population studies, cross-cultural comparisons, social organization and change, or social psychology, but all majors must take one course in at least three different subfields. Majors in general sociology or in social relations may transfer into honors sociology if they meet its requirements.

Society and economy program. Sociology majors who seek a career in business and management may elect to concentrate in the society and economy program. This program is designed to prepare students for graduate school and professional schools of business and management, providing training in organizational behavior, quantitative data analysis, and economic sociology. For advice in a business and management concentration, see the director of the society and economy program.

Cornell-in-Washington program. Qualified sociology majors may include a semester in the Cornell-in-Washington program, in which students take courses and undertake a closely supervised internship. For further information, see p. 7.

Supervised research. Qualified sociology majors are invited to participate with faculty members in conducting research. Such projects are usually initiated in one of two ways: the student may offer to assist the faculty member in an ongoing project, or the student may request that the faculty member supervise the execution of a project conceived by the student. In either case the student should enroll in Sociology 491. Interested students may direct inquiries to any faculty member.

Introductory Courses

The recommended introductory sequence is Sociology 101 and either Sociology 103 or 105, but any of these courses may be taken alone.

101 Introduction to Sociology

Fall or spring.

3 credits.

M W 11:50 plus one hour to be arranged.

M. McPherson, L. Smith-Lovin.

A general survey of concepts, theory, and representative research in sociology.

103 Introduction to Sociology: Microsociology

Fall.

3 credits.


An introduction to microsociology, focusing on concepts and theory of social processes within small groups, including the family. Emphasis is on leadership, conformity, social influence, cooperation and competition, distributive justice, and micro-analyses of interaction.

105 Introduction to Sociology: Population Dynamics (also Rural Sociology 108)

Spring.

3 credits.


An introduction to microsociology, focusing on concepts and theory of social processes within small groups, including the family. Emphasis is on leadership, conformity, social influence, cooperation and competition, distributive justice, and micro-analyses of interaction.

General Education Courses

202 Writing in the Social Sciences (also Writing 202)

Fall or spring.

3 credits. Limited to 17 students each section. Prerequisite: one social science course.


This course helps students write and read with more confidence and skill, especially in the social sciences.
The course investigates the ways in which social scientists use language. How and why does their writing vary? How do their theories, objectives, methods, and audiences affect their writing? We will address these questions through discussion and writing about works by social scientists in various fields. Both discussion and writing will aim to strengthen the composition skills that are important in academic work: analysis, comparison, and summary of texts; description and argument; handling of evidence, references, and quotations; and strategies for revision. Instruction will include frequent individual conferences on finished essays and work in progress. Students will write, often revising, eight to ten papers—about thirty pages of finished work.

240 Personality and Social Change  Spring  3 credits (4-credit option available).  TR 1:25-2:40. B. C. Rosen. An analysis of social and psychological factors that affect and reflect social change. Topics to be examined will include models of man and society, national character, modern melancholy, feminism, family and sex roles, industrialism, economic development, and psychocultural conflict.

241 Applied Sociology  Fall. 3 credits. (4-credit option available). Not offered 1987–88.  M W F 1:25. S. Caldwell. Established professions—medicine, management, law, journalism—resemble one another in the newer ones—polling, behavioral medicine, evaluation research—increasingly utilize sociological findings and methods. The benefit is often mutual, since the discipline of sociology gains from having its theories exposed to practical tests. Drawing frequently on case studies, this course probes the two-way flow of ideas and practices between modern professions and social research. Policy simulation exercises will be carried out on microcomputers.

243 Family  Fall. 3 credits (4-credit option available). Fall. TR 10:10–11, plus one hour to be arranged. B. C. Rosen. A social and historical analysis of the family both in the West and cross-culturally. Specific areas examined include sex roles, socialization, mate selection, sex and sexual controls, internal familial processes, divorce, disorganization, and social change.

245 Inequality in America  Spring. 3 credits (4-credit option available). Not offered 1987–88.  TR 10:10–11:30. S. Olzak. This course deals with sociological explanations for various forms of social and economic inequality, particularly inequalities associated with class and work. We will describe systems of inequality, analyze various theoretical explanations for those systems, and examine the various structures designed to reduce or eliminate inequality.

248 Politics in Society  Spring. 3 credits (4-credit option available). TR 1:25–2:40. B. Rubin. An examination of the relationships between economic, social, and political structures in industrial societies with particular emphasis on the United States. Topics include distributional terms of participation in society at large, social movements, the structure of power and its legitimation, the emergence of the welfare state, and the tensions between political and economic structures.

252 Public Opinion  Summer. 3 credits (4-credit option available). A. Bibilowicz. An exploration of how our images of self and society, and specific social processes, are influenced by radio, television, and newly emerging communication and information systems. Introduces students planning careers in the human communications professions, and the sciences to a sociological perspective on the organization of communication systems and their influence on thought, consciousness, and social change. Development of electronic communication systems from the early days of radio and television to the present, and current viewpoints on the relationship of communication, information, and social processes.

263 Black Americans: Recent Social Changes  Fall. 3 credits (4-credit option available). Prerequisite: one course in sociology or Africana studies. Not offered 1987–88.  TR 12:45–1:15. R. Williams. A critical synthesis of research evidence on the status of Black Americans since World War II. Primary emphasis is on changes in four major institutional sectors: economic, political, education, and social and cultural integration and separation. The latter sector includes residence and housing, voluntary associations, religious organizations, mass communications, expressive culture and ideologies, social stratification, and informal social networks. Future prospects will be appraised against the background of unprecedented institutional changes in American society.

265 Hispanic Americans  Spring. 3 credits (4-credit option available).  TR 2:55–4:10. H. Velez. Analysis of the present Hispanic experience in the United States. An examination of sociohistorical backgrounds as well as the economic, psychological, and political factors that converge to shape and influence the Hispanic experience (in the United States) are developed for understanding the diverse Hispanic migrations, the plight of Hispanics in urban and rural areas, and the unique problems faced by the various Hispanic groups. Groups studied include Dominicans, Chicanos, Cubans, and Puerto Ricans.

277 Psychology of Sex Roles (also Psychology 277 and Women's Studies 277)  Spring. 3 credits (fourth credit for optional empirical research paper). Limited to 200 students. Prerequisite: an introductory psychology course. TR 2:55–4:25. Staff. This course addresses the question of why and how adult women and men come to differ in their overall life styles, work and family roles, personality patterns, cognitive abilities, etc. This broad question is examined from five perspectives: (a) the psychoanalytic perspective, (b) the biological perspective, (c) the historical and cultural evolutionary perspective, (d) the child development perspective, and (e) the socialpsychological and contemporaneous perspective. Each of these perspectives is also brought to bear on more specialized phenomena relating to the psychology of sex. Sectors to be examined include (a) biological and androgyny, women's conflict over achievement, the male sex role, equilibrant marriage relationships, gender-liberated child-rearing, female sexuality, homosexuality, and transsexualism.

283 Groups and Relationships  Fall or spring. 3 credits. Enrollment limited to ten men and ten women in each section. Fall, M or W 7:30–10 p.m.; spring, M or R 7:30–10 p.m. L. Melzer. The processes and societal functions of small groups (such as teams, committees, and fraternities) and dyadic relationships (such as engaged couples, parent and child, and friends). Involvement in self-study as individuals and as group participants is an integral part of the course. The goal is increased sensitivity to group processes, heightened awareness of the effects we have on others, and an understanding of how these phenomena relate to larger societal phenomena.

Methods and Statistics Courses  

301 Evaluating Statistical Evidence  Fall. 4 credits. M W F 10:10 R. L. Breiger. A first course in statistical evidence in the social sciences, with emphasis on statistical inference and multiple regression models. Theory is supplemented with numerous applications.

302 Sociological Data Analysis  Spring. 4 credits. Prerequisite: Sociology 301 or equivalent. M W F 10:10 S. Caldwell. A course providing training in analysis of socioeconomic data using introductory statistics. The course is organized around the analysis of data sets reflecting major areas of social science research. Emphasis is placed upon involving students in the use of computers in understanding contemporary society and social issues.

303 Primary Data Collection and Design  Spring. 4 credits. Prerequisite: a course in sociology. TR 1:25–2:40. D. Holmes. Foundations of sociological analysis; issues arising from using humans as data sources; the quality of our primary data; methods of its collection; research designs in wide use and their limitations; pragmatic considerations in doing research on humans, organizations, communities, and nations.

Intermediate Courses  

310 Sociology of War and Peace  Fall. 4 credits. Prerequisite: a course in sociology or government. TR 1:25–2:40. R. M. Williams. Every human group or society presents many examples of altruism, help, cooperation, agreement, and social harmony. Each grouping or society also manifests numerous examples of conflict, rivalry, competition, disagreement, conflict, and violence. Both conflict and cooperation are permanent and common aspects of the human condition. Collective conflicts, especially wars and revolutions, are frequent and dramatic events. But “peace” and “war” are equally active social processes, not passive happenings. This course describes various commonly accepted but erroneous notions of the causes and consequences of war and determinants. It deals with the major theories concerning the sources of war in international and intranational social systems. The last half of the course analyzes the modes, techniques, and outcomes of efforts to restrict, regulate, and resolve international conflicts.

328 Sociology of Work  Spring. 4 credits. TR 10:10–11:25. B. Rubin. With the exception of those too rich, too ill, too young, or too old, most people in the United States will spend the majority of their waking lives working. Some will spend that time engaged in activity they enjoy. Others will be trapped in jobs that lead them to the senses, cramp creativity, and provide only a paycheck as a reward. Nevertheless, the centrality of work in most of our lives is taken for granted; so too are the ways in which work is organized about, the forms in which work is paid for, the consequences of the organization of work in capitalist America.

341 American Society  Spring. 4 credits. Prerequisite: a course in sociology or permission of instructor. Not offered 1987–88. M W F 9:05 R. M. Williams. Jr. Analysis of a total societal system. Critical study of the institutions of kinship, stratification, the economy, the political system, education, and religion. Special attention is given to values and their interrelations and to deviance and evasion. A survey of the groups and associations making up a pluralistic nation is included.

348 Sociology of Law  Fall. 4 credits. M W F 10:10 C. Bohmer. Legal decisions and legal practices viewed within the context of society's institutions and customs. Topics vary from semester to semester but deal with issues such as civil rights versus society's rights, variations in permissible sexual practices in different cultures, the social organization of crime and deviancy and its effects on justice and equity, changing divorce laws in relation to changes in the status of women, the role of psychiatry in the legal process, and judicial attitudes toward rape victims.
350 Organizations, Individuals, and Social Structure Spring. 4 credits. Prerequisite: two courses in sociology.
Organizations are composed of people, but at the same time they can be regarded as actors in their own right, distinct from their members. This course introduces recent sociological theory and research on the relations among organizations and between organizations and individuals. Topics include the reasons for organization, effects on social conflict, stratification among organizations, and the extent to which organizations represent their members’ interests. Examples will be drawn from firms, labor unions, and political organizations.

355 Social and Political Studies of Science (also City and Regional Planning 442 and Biology and Society 442) Spring. 3 credits.
A view of science, less as an autonomous activity than as a social and political institution. We will discuss such issues as secrecy in science, ethical and value disputes, and the limits to scientific inquiry in the context of the changing relationships between science and the public.

359 American Families in Historical Perspective (also Human Development and Family Studies 359 and Women's Studies 357) Spring. 3 credits. S-U grades only. Prerequisites: HDFS 150 or one 200-level social science or history course. Human ecology students must register for HDFS 359.
This course provides an introduction to, and overview of, problems and issues in the historical literature on American families and the family life cycle. Reading and lectures demonstrate the pattern of American family experiences in the home, organization on class, ethnicity, sex, and religion as important variables. Analysis of the private world of the family deals with changing cultural conceptions of sexuality, sex roles, generational relationships, stages of life, and life events. Students are required to do a major research paper on the history of their family, covering at least two generations and demonstrating their ability to integrate life-course development theory, data drawn from the social sciences, and historical circumstances.

367 Latin American Society Spring. 2–3 credits (third credit earned by doing a research paper). Not offered 1987–88.
Latin American revolutions examined in the context of long-term processes of social and economic change. Focus on Mexico, Cuba, and Central America. Topics include development strategies, the relationship between economic growth and distribution, class conflict in urban and rural settings, demographic change, and the influence of foreign investors and their governments.

369 Contemporary Chinese Society Fall. 4 credits.
This course provides an introduction to Chinese society, its social organization, and its institutions. Since 1949 the Chinese development models China has pursued have had differing consequences for society. What effects have they had on societal change—on stratification, community development, politics, the economy, work, schooling, family life, the position of women, personal relationships, and the meaning of life and values? What lessons can we draw from the Chinese experiences in implementing state-directed social changes? How do we assess the accomplishments and failures? Recent field research on China will be cited.

372 Sex Discrimination: Law and Social Policy (also Women's Studies 372 and Government 306) Fall. 3 credits.
This course will cover the legal and social trends in the area of sex discrimination. It will examine the relationship between feminist consciousness and developments in gender-related constitutional law. We will discuss the meaning of sex discrimination in the context of various areas of importance and examine the role of the law in redressing or perpetuating social and legal inequities.

375 Economic Sociology Fall. 4 credits.
Considers the reasons for organization, conflict at the border of sociology and economics, with special attention to the sociological constraints on economic organization and the impacts of economic organization on social change. Topics covered include marriage, marriage market, the structure of firms, labor unions, world systems processes, social movements, and revolution.

Fine-grain analyses of social behavior, its structure, changes, and determinants. Extensive practice in analysis of filmed and taped interactions. Student research is required throughout the course.

384 Cross-Cultural Psychology (also Psychology 384) Spring. 4 credits. Prerequisites: a course in psychology and one in either sociology or social or cultural anthropology, or permission of instructor.
M W F T 10:05. W. L. Lambert.
A critical survey of approaches, methods, discoveries, and applications in emerging attempts to study human nature, experience, and behavior cross-culturally. Focus on studies of cognition, values, socialization, sociolinguistics, personality, attitudes, stereotyping, ideology, sociocultural development, and mental illness. Problems of how one can learn another culture will also be dealt with.

385 Theories of Personality (also Psychology 385) Fall. 4 credits. Prerequisite: Psychology 101 or 275, or permission of the instructor.
An intermediate analysis of comparative features of the historically and currently important theories of personality, with an evaluation of their systematic empirical contributions to modern personality study, to psychology, and to other behavioral sciences.

Advanced Courses
The following courses are intended for advanced undergraduates with substantial preparation as well as for graduate students in sociology and related disciplines. Students who are not sure whether their background is sufficient for a particular course should consult the professor in charge.

401 Theories of Society (also Rural Sociology 301) Fall. 4 credits. Not offered 1987–88.
An advanced undergraduate seminar for senior majors in sociology and rural sociology. The course will focus on (1) the central concepts of the sociological tradition; (2) major classical theorists (Max Weber, Durkheim, de Tocqueville) and contemporary counterparts; (3) application of the classical ideas in contemporary research.

A critical survey of theories and techniques of structural analysis in sociology, centering on the usefulness of network analysis in providing integration of studies at different levels of generality. Applications in the areas of the sociology of organizations, community studies, social stratification, and dependence relations among nations. Emphasis on the mutual relations of theories and operational research procedures.

404 Human Fertility in Developing Nations (also Biology and Society 404 and Rural Sociology 408) Fall. 4 credits. Prerequisite: Sociology 105 or 430 or permission of instructor.
A review of the major literature dealing with the social causation of variation in human fertility. Emphasis will be on international comparisons and on the methodology of field research.

409 Interpretation, Authority, and the Law Spring. 4 credits.
Hours to be arranged. S. Jasani. 
A seminar designed to study the course by which society allocates authority for interpreting the law among diverse social actors and institutions. In exploring this theme, the seminar will review competing approaches to interpreting legal texts such as the United States Constitution and will ask how different interpretations can be accommodated without destroying the authoritativeness of the law. Readings for the seminar will include theoretical materials from several disciplines as well as cases dealing primarily with the legal definition and treatment of minorities and social deviants. Looking at cases in the areas of race and sex discrimination, free speech, and religious freedom, the seminar will illuminate the role of law in organizing social behavior, as well as the impact of politics, history, and culture on the shaping of legal norms.

[414 Population Policy (also Biology and Society 414 and Rural Sociology 418) Fall. 4 credits. Prerequisite: graduate standing or permission of instructor. Not offered 1987–88.
The ways in which societies try to affect demographic trends. Special focus is on government policies and programs to reduce fertility.

420 Mathematics for Social Scientists Fall. 2–4 credits.
Elementary matrix algebra, probability theory, and calculus.

Hours to be arranged. S. Caldwell.
Examines the distinctive character of that social research which is sponsored and carried out explicitly for the purpose of informing policy. Intended especially for students considering nonacademic careers. Draws frequently from case studies to probe the methodological requirements, substantive flavor, and partisan context of applied research and also to identify the institutional actors involved in its sponsoring, production, and use.

430 Social Demography (also Rural Sociology 438) Spring. 4 credits. Prerequisites: junior class standing or permission of instructor. Not offered 1987–88.
M W F 9:05. A survey of the methods, theories, and problems of contemporary demography. Special attention is directed to the social determinants and consequences of fertility, mortality, and migration. The populations of both developed and developing areas are examined.

A description of the nature of demographic data and the specific techniques used in their analysis. Mortality, fertility, migration, and population projection are covered, as well as applications of demographic techniques to other types of data.

443 Ethnicity and Economy in American Society Spring. 4 credits.
The course analyses the relations between ethnic membership, economic action, and class position in
American society. What effect does ethnic membership have on getting a job, on educational attainment, and on who gets ahead? Sociological theories and the empirical evidence to support them are reviewed. The course will focus on the role of race and class and also interwoven and seeks to explore the relative weight of ethnicity in attainment in American society.

444 Contemporary Research in Social Stratification Fall. 4 credits. Not offered 1967–88. R. L. Breiger. Stratification and mobility as paired concepts requiring mutual articulation. The interplay of structure (occupational groupings, labor markets; organizational demographics, social classes) and process (tracking, career trajectories, socioeconomic attainment).

463 Political Sociology Spring. 4 credits. Prerequisite: Sociology 248 or equivalent or any three courses in sociology and government. T R 11:40–12:55. D. Weakliem. Analyzes the relationship between politics and social structure, focusing on contemporary capitalist democracies. Topics include voting behavior, party systems, political power, and the political role of nongovernmental organizations.

467 Seminar on the Nicaraguan Revolution Spring. 4 credits. Prerequisite: permission of instructor. M 2–4, W 12–2, T 10–11:45. B. C. Rosen. The Sandinista revolution in sociological perspective. Topics to be covered include the agro-export basis of prerevolutionary society, the origins of the 1979 revolution, the ideology and organization of the Sandinista political economy and social policy, religion and revolution, women in the revolution, and United States–Nicaraguan relations. Students will write a substantial research paper. Previous academic or personal exposure to Latin America is desirable.

486 Women and Achievement Fall. 4 credits. T 1:30–3:30. B. C. Rosen. Analysis of an analysis of social and psychological factors affecting female achievement. Topics will include women in the labor force, sex differences in children's achievement, the impact of sex roles on the socialization of competence and achievement among women, and the impact of marriage and the family on career choice and occupational achievement.

470 Research Seminar in Social Movements and Collective Action Spring. 4 credits. Limited to 15 students. Primarily for sociology majors and upper-division students. Not offered 1967–88. R 2:30–4:30. S. Ozkaz. Analysis of the dynamics of social movements, including such topics as causes of the women's movement, the civil rights' movement, anti-apartheid activity, as well as historical social movements in the United States and elsewhere. The emphasis will be on learning contemporary sociological methods and techniques for collecting and analyzing instances of collective behavior and event-histories of social movements. Students will have access to several original data sets of collective action and will present their own research during the course of the seminar.

491 Independent Study Fall or spring. 1–4 credits. For undergraduates who wish to obtain research experience or to do extensive reading on a special topic. Interested students must submit a petition, available at the departmental offices, 314–315 Urs Hall. Permission to enroll for independent study will be granted only to students who present an acceptable prospectus and secure a faculty member to serve as supervisor for the project throughout the term. Graduate students should enroll in 891–892.

495 Honors Research Fall or spring. 4 credits. Limited to seniors majoring in their major area. Prerequisite: permission of instructor. Hours to be arranged. S. Caldwell and staff.

496 Honors Thesis: Senior Year Fall or spring. 4 credits. Prerequisite: Sociology 495. Hours to be arranged. S. Caldwell and staff.

497 Social Relations Seminar (also Anthropology and Sociology 526) Spring. 4 credits. Limited to seniors majoring in social relations. Hours to be arranged. Staff.

Graduate Core Courses

These courses are primarily for graduate students in sociology but may be taken by other graduate students with permission of the instructor. Graduate students in sociology will normally take each of the five core courses listed below, but with the concurrence of their special committees other arrangements may be made.

501 Basic Problems in Sociology I Fall. 4 credits. T 3–5. R. L. Breiger. Analysis of theory shaping current sociological research. Examination of several central problems in sociological inquiry provides an occasion for understanding tensions and continuities between classical and contemporary approaches, for indicating the prospects for unifying microsociological and macrosociological orientations, and for developing a critical appreciation of efforts to integrate theory and research.


505 Research Methods I: Logic of Social Inference Fall. 4 credits. Prerequisite: a first course in statistics and probability. M W F 9:05–11 (including the weekly lab). S. Caldwell. The statistical logic of social inquiry, using the formal language of multivariate regression, with emphasis on applications. Threats to inference—and techniques for meeting such threats—are examined within each stage of inquiry: conceptualization, measurement, design, specifying, exploring, testing and evaluating models; dissemination and influence of results. Scope includes survey, comparative-historical, and experimental styles. Work load includes weekly lab exercises with data, attention to subject-matter articles, and a research proposal. The first course in a three-course methods sequence (505–507).

506 Research Methods in Sociology II Spring. 4 credits. Prerequisites: Sociology 420 or 505 or equivalent. M W F 1–3. R. McGinnis. Matrix models for analyzing continuous (interval or ratio scalar) outcome variables, emphasizing the general linear model. Model assumptions, consequences of violations, and regression diagnostics. Weekly assignments using computer programs SAS and BMDP and micro MiniTab for analysis of on-line data sets.

507 Research Methods in Sociology III Fall. 4 credits. Prerequisite: Sociology 505. M 2:30–5. D. Weakliem. Treatment of models and methods for analyzing qualitative (discrete) outcomes. Attention is given to both static and dynamic models and methods. Topics covered include log-linear models for cross-classifications, regression models for discrete outcomes, and event-history analysis.

Graduate Seminars

These seminars are primarily for graduate students but may be taken by qualified advanced undergraduates who have permission of the instructor. Which seminars are to be offered any term is determined in part by the interests of the students, but it is unlikely that any seminar will be offered more frequently than every other year. Lists and descriptions of seminars are available from the department in advance of each semester. The list below indicates seminars that are likely to be offered in 1967–88, but others may be added, and some may be deleted. Students should check with the department before each term.

509 Seminar on Sociology of Organizations (also Management NRE 547) Fall. 4 credits. Hours to be arranged. J. Freeman. This course explores current research on organizations. The current literature can be broken up into four subareas: (1) population ecology of organizations (the class will read Hannan and Freeman, Organizational Ecology); (2) institutional theory; (3) organizations as mechanisms of social stratification (including work on occupational mobility and internal labor markets); and (4) economics of organization (including such topics as agency theory, transaction costs, and economic approaches to collective action). These areas will be explored in depth reflecting student interest. For each, stress will be placed on the opportunities for empirical research and limitations of organizationalization.

515 The Politics of Technical Decisions I (also City and Regional Planning 541, Management MBA 686, Biology and Society 415, and Government 628) Fall. 4 credits. W 2:30–4:25. D. Nelkin. Political aspects of decision making in technical areas. Drawing from recent risk disputes, we will examine the origins and characteristics of "technical politics," the role of experts in government, and the problem of expertise in a democratic system.

516 The Politics of Technical Decisions II (also City and Regional Planning 542, Management MBA 687, Biology and Society 416, and Government 629) Spring. 4 credits. Prerequisite: The Politics of Technical Decisions I. Hours to be arranged. D. Nelkin. Continuation of the Politics of Technical Decisions I. Political aspects of decision making in technical areas. Drawing from recent risk disputes, we will examine the origins and characteristics of "technical politics," the role of experts in government, and the problem of expertise in a democratic system.

530 Field Research in Sociology Spring. 4 credits. Not offered 1967–88. Hours to be arranged. V. Nee. This course will deal with the organization and execution of studies of social life in naturally occurring settings—through participant observation and various forms of interviewing, as well as the analysis of personal and historical documents. After a brief discussion of selected issues in the methodology of social research, attention will center on a critical examination of five published studies—to ascertain in each case just what the investigator was trying to do and the extent to which he or she succeeded. During the semester each student will be expected to develop a detailed study design and to do whatever preliminary tasks that are necessary. This may be a doctoral dissertation, an M.A. research project, or some other inquiry on a problem of personal interest.

555 Social Structure and Social Change Spring. 4 credits. Not offered 1967–88. M. Hannan. Considers application of sociological theory and methods to the study of core problems of social structure and social change. Involves intensive analysis of recent monographs and research reports on a variety of topics.
565 Seminar on Voluntary Associations  Spring. 4 credits.
This is a study of the literature on voluntary associations, which can be described as groups that are not business, government, or family. The literature reflects the extreme diversity of the subject: there are thousands of references in sociology, political science, anthropology, psychology, economics, and related areas. The course will draw on readings from a broad selection of these sources, beginning with some of the earliest references and finishing with some modern empirical and theoretical work.

582 Models of Social Action  Spring. 4 credits.
This course introduces students to models that link meaning, knowledge, and social behavior. Three types of models will be explored: (1) models that relate social structure to shared knowledge, (2) production system approaches, which view knowledge as a role program; and (3) cybernetic models, which suggest that meaning and behavior can be described as a negative feedback system. Related work on knowledge representation in psychology, linguistics, and artificial intelligence will be reviewed.

585 Social Structure and Personality (also Psychology 585)  Fall. 4 credits. Not offered 1987–88.
B. C. Rosen.
An analysis of the ways in which social and psychological factors interact to affect the development of personality, the roles of individual and group behavior, and the functioning of social systems.

591 Special Seminars in Sociology  Fall and spring. 2–4 credits.
A variable seminar in an advanced area of sociology. Topics, credit, and instructors will vary. These seminars will be offered irregularly.

606–607 Sociology Colloquium  Fall and spring. No credit. Required of all graduate students. Juniors and seniors are encouraged to attend.
F 3–4. Staff.
A series of talks representative of current research interests in sociology, given by distinguished visitors and faculty members.

608 Proseminar in Sociology  Fall. One credit.
T 11:40–12:55. S. Caldwell and staff.
Discussions on the state of sociology and on the interests of the members of the field, given by members of the field.

617 Capital, Labor, and Organization of Work  Fall. 4 credits.
W 2–4:30. B. Rubin.
This is a research seminar that deals with structural determinants of work-related inequalities. The goals of the course will be for us to acquire a theoretical understanding of these issues and to identify potentially interesting and important empirical questions that speak to these theoretical concerns. The topics that will be covered span the literatures in a variety of subdisciplines: social stratification, sociology of work, organizational theory, sociology of occupations and industries, and labor economics. The organizational framework for relating these literatures will be the roles of characteristics of capital (e.g., employers, organizations, industrial contexts) and labor (e.g., worker organization and control over the labor process), and the relations between the two, in generating economic and noneconomic work-related inequalities. We will focus primarily, though not exclusively, on the United States case.

645 Comparative Race and Ethnic Relations  Spring. 4 credits.
Evaluation of recent research and theory in the study of race and ethnic relations, including analysis of the stability and dynamics of ethnic boundaries, causes of ethnic solidarity, and ethnic collective action. We will also examine causes of ethnic stratification, mobilization, separatism, and other forms of ethnic social movements and protest.

683 Social Interaction (also Psychology 683)  Spring. 4 credits.
Seminar: topic to be announced.

685 Sex Differences and Sex Roles (also Psychology 685 and Women’s Studies 685)  Fall. 4 credits. Not offered 1987–88.
F 3–6. Staff.
Hours to be arranged. B. Stem.

891–892 Graduate Research 891, fall; 892, spring. Up to 4 credits each term, to be arranged. Prerequisite: graduate status and permission of a faculty member willing to supervise the project.

895–896 Thesis Research 895, fall; 896, spring. Up to 6 credits each term, to be arranged. Prerequisite: permission of thesis director.

Related Courses in Other Departments
Families and Social Policy (Human Development and Family Studies 456)  Fall. 3–4 credits.
Prerequisite: one course in the area of the family or in sociology, U 3 credits. On campus and in Washington. F 10–12. P. Moen.

Contemporary Family Theory and Research (Human Development and Family Studies 650)  Spring. 3 credits.

Strategy Implementation: Process and Politics (Management MBA 660)  Fall. 4 credits.

Organizational Theory and Behavior (Management NCC 504)  Fall. 3 credits.
Hours to be arranged. M. Abolafia.

Swahili
See Africana Studies, Languages, and Linguistics.

Spanish
See Modern Languages, Literatures, and Linguistics.

Swedish
See Modern Languages, Literatures, and Linguistics.

Tagalog
See Modern Languages, Literatures, and Linguistics.

Tamil
See Modern Languages, Literatures, and Linguistics.

Telugu
See Modern Languages, Literatures, and Linguistics.

Thai
See Modern Languages, Literatures, and Linguistics.

Theatre Arts

Drama, Dance, Film

Through its courses and production laboratories, the department provides students with a wide range of opportunities in drama, dance, and film. It offers a major in theatre arts with a concentration in drama or film, and a major in dance. These majors provide students with an education in theatre, dance, and film that is in accordance with the general liberal arts ethic of the college, and they also provide some measure of preprofessional training in these arts. The department also provides the Cornell community with opportunities to participate in productions on an extracurricular basis.

Theatre Arts Major
Prerequisites for admission to the major (to be completed by the end of the sophomore year):

1) Theatre Arts 230
2) Either Theatre Arts 250 or 280
3) A grade of C or better in the above courses
4) Consultation with the department’s director of undergraduate studies.

Drama Concentration
Requirements for the classes of 1986 and 1987:

1) Theatre Arts 230, 250, and 280

2) Four laboratory courses distributed as follows: one run-cw experience (151), one stage management experience (153), one acting or dance experience (155), one advanced crew or second run-cw in a different area (51, 251, 351, or 451)

3) Four courses in theatre studies, chosen in the following manner: one course from Theatre Arts 325, 326, 327; one course from Theatre Arts 331, 332, 333; one course from Theatre Arts 334, 335, 336; one course from Theatre Arts 431, 432, 433, 434, and 435

4) Four courses (at least 12 credits) in other departmental courses, chosen in consultation with an adviser.
5) Two courses in related areas outside the department, chosen in consultation with an adviser.
6) Courses in which a student receives a grade below C cannot be used to fulfill the requirements for the major.

Requirements for the class of 1988 and beyond:
1) Theatre Arts 201 or 206, 230, 250, and 280.
2) Same as classes of 1986 and 1987.
3) Same as classes of 1986 and 1987.
4) Three courses (at least 9 credits) in other departmental courses, chosen in consultation with the student's faculty adviser.
5) Same as classes of 1986 and 1987.
6) Same as classes of 1986 and 1987.

Film Concentration
Requirements:
1) Theatre Arts 230 or 240, 250 and 280.
2) Theatre Arts 374 with a grade of C+ or better.
3) 16 credits in film that should include:
   a) two courses chosen from Theatre Arts 375, 376, 378, and 379.
   b) Theatre Arts 377.
   c) Theatre Arts 475 or 477.
4) 8 credits in other theatre arts courses.
5) 12 additional credits of related work outside the department.
6) An average of C+ or better in all theatre arts courses.

The Dance Program
In addition to courses in composition, history, and movement sciences, courses in dance technique are offered each semester. Four levels of modern and three of ballet. Registration takes place in Teague Hall. Technique classes are intended to develop strength, flexibility, coordination, the ability to perceive and reproduce phrases of dance movement with rhythmic accuracy, clarity of body design, and fullness of expression. The more advanced classes require the mental, physical, and emotional flexibility to perform more complex phrases in various styles. Dance styles and forms such as jazz, Japanese Noh, and Indian and Javanese dance are offered on a rotating basis. Students may satisfy the physical education requirement by taking any of these courses. Up to four academic credits may be earned (one each semester) for enrollment in intermediate or advanced technique only (see Theatre Arts 304, 306, 308). The schedule for technique classes is available in the Dance Office, Helen Newman Hall.

Students may receive credit for performance in student-faculty concerts by enrolling in Theatre Arts 155. Repertory and performance workshops are offered in which staff choreograph and conduct rehearsals for performance of original dance works. Admission is with permission of the instructor. Hours are arranged through the Dance Office. Helen Newman Hall. One academic credit (S-U grades only) may be earned for such work.

Dance Major
The dance program is housed in Helen Newman Hall. To be admitted to the major, students must have completed or shown competence in intermediate modern technique by the beginning of the junior year.

Requirements:
1) A minimum of one technique class each term chosen from Theatre Arts 304, 306, or 308, one credit each term for four terms.
2) Theatre Arts 210, 211, 312, 314, and 315.
3) 30 additional credits in related fields chosen in consultation with advisers.

Departmental Honors Program
Candidates for the degree of Bachelor of Arts with honors in theatre arts must fulfill the requirements of the major and maintain an average of B+ in departmental courses and an average of B in all courses. Any such student may, at the beginning of the second semester of the junior year, form a committee of three faculty members to guide and evaluate the honors work. The work will culminate in an honors thesis or practicum to be presented not later than the last day of classes in the final semester of the senior year and an examination to be held not later than the week after the thesis or practicum has been submitted.

Theatre Laboratories
Theatre Cornell, the department's producing organization, annually presents a season of classic and modern dramatics, dance concerts, and experimental theatre. This organization functions as the department's principal laboratory for developing actors, directors, dancers, playwrights, designers, technicians, stage managers, and arts administrators.

Production experiences are under the direct supervision of the department's staff and are organized into laboratory courses according to the skill and level of involvement. Students may register for the laboratories most appropriate for their participation.

1) Design and technology laboratories: Students may enroll either term in Theatre Arts 151, 153, 251, 351, or 451. These courses progress from elementary crew participation to full design, technical, and stage management assignments. Laboratories should be taken concurrently with allied content courses.
2) Rehearsal and performance laboratory: Students may enrol in Theatre Arts 185, 751, or 752 after being assigned roles through auditions in theatre or dance productions.

All production laboratory courses listed above may be repeated for credit and may be added without penalty at any time during the term with the permission of the instructor. Students are encouraged to participate in Theatre Cornell productions at any time on an extracurricular noncredit basis.

Film Study Abroad
The College of Arts and Sciences, through this department and in consort with seventeen other colleges and universities, offers up to a full year's study at the Inter-University Center for Film and Critical Studies in Paris, France. The center's program is theoretical, critical, and historical. It is most useful to students pursuing a major in film studies and serves as an intensive supplement to their Cornell film courses. Fluency in French is required, and Theatre Arts 374, 375, and 376 are prerequisites. Inquiries should be addressed to Professor Fredericksen, Cornell's liaison with the center.

Scholarship
The Charles B. Moss Scholarship is administered by the department. The recipient is chosen from among those majors in the department who demonstrate exceptional ability.

Freshman Writing Seminar Requirement
The freshman writing seminar requirement may be satisfied by Theatre Arts 108, 130, 140, or 150.

Courses

108 Writing about Film (also English 108) Fall, spring, or summer. 3 credits. Not offered in Theatre Arts 187–88.
TR 12:20–1:35.
This course is meant to serve not as an introduction to film analysis, but as a writing seminar that takes cinema as its primary object of attention. Students will be asked to apply the rhetorical strategies of theatre to their own essay writing. Texts will include Theatre Cornell productions.

130 American Myth in Drama Fall or spring. 3 credits. MWF 1:25. J. Gardner, 10:10. J. Balakian.
This course examines the images of America presented on the twentieth-century stage. How do Americans view themselves? How are they seen by foreign playwrights? To what ends do dramatists use the American myth?

140 From Script to Stage: Writing about the Theatrical Process Fall or spring. 3 credits. TR 11:40–12:55. K. Angland.
In this course students will explore and write about the process through which drama becomes theatre: how the methods of playwright, actor, director, and designer dovetail to create the theatrical piece. Students will be asked to apply the rhetorical strategies of theatre to their own essay writing. Texts will include Theatre Cornell productions.

150 Looking at Dance Fall. 3 credits. Not offered 1987–88.
This course will explore various aspects of dance writing with descriptive prose, essays, and reviews. The work of some twentieth-century critics and philosophers will be read for information and perspective and as models of style. Viewing of photographs, films, videotapes, and live performance will complement the readings.

151 Production Laboratory I Fall or spring. 1–2 credits. May be repeated for credit. Orientation meeting in Willard Straight Theatre at 7:30 p.m. on the first Tuesday of classes.
R. Archer. S. Perkins.
Practical experiences connected with Theatre Cornell productions. Possible options are construction of costumes or scenery or the preparation of lights for productions. Also available are experiences backstage during performances and assisting with the organization of scenery, properties, or costumes. No prior classes or experience required. Instruction in basic techniques by appropriate faculty.

153 Stage Management Production Laboratory Fall and spring. 1–3 credits. May be repeated for credit. Orientation meeting in Willard Straight Theatre at 7:30 p.m. on the first Tuesday of Classes.
Staff.
Practical production experience and specific responsibility—on all levels—in stage management of department productions. Theatre Arts 370 complements this course. Guided and supervised by appropriate faculty on individual productions.

155 Rehearsal and Performance Fall or spring. 1–2 credits. 1 credit per production term up to 2 credits per term. Students must register for the course in the term in which credit is earned; requests for retroactive credit will not be honored. Limited to students who are assigned roles after tryouts at the department's scheduled auditions or who are assigned assistant director positions after obtaining director's approval. Students should add this course only after they have been assigned roles. S-U grades only.
Staff. The study, development, and performance of roles in departmental theatre or dance productions or the study and practice of directing as experienced in assisting faculty and guest directors.

200 Introduction to Dance Spring. 3 credits. MWF 1:25. P. Lawler. J. Morgenroth, and staff.
Introduction to aesthetic and theoretical issues in Western theatrical dancing, with emphasis on the twentieth century. Viewing of films and videotapes and discussion of readings. Two papers.

201 Dance Improvisation Fall. 3 credits. Limited to 12 students. Concurrent enrollment in a dance technique class at the appropriate level is required. Registration only through departmental roster in 301 Helen Newman Hall.
Exploration of movement invention and group composition through structured dance improvisation. Live musical accompaniment.

206 Making Dances to Music Spring. 3 credits. Limited to 12 students. Concurrent enrollment in a dance technique class at the appropriate level is required. Registration only through department roster in 301 Helen Newman Hall. T R 4:45–6:15 P. Sullivan. An introduction to the world of expression through movement to music (no previous experience required). Experiments choreographing to various music styles. In-class improvisation to composition assignments using popular, classical, and contemporary avant-garde music. Studies will be performed at mid-term and end-of-semester informal studio showings. Fall and spring. Additional required attendance at performance of Cornell Dance Series and one short paper.

210 Beginning Dance Composition and Music Resources Fall or spring. 4 credits. Limited to 15 students. Registration only through department roster in 301 Helen Newman Hall. Prerequisite: permission of instructor. Concurrent enrollment in a dance technique class at the appropriate level is required. M W 6:30–8 J. Finch. Students compose and perform a series of original studies that deal with aspects of making dances and that have first been explored through class improvisation. Designed also to develop student choreographic ideas, the course includes extensive discussion and one independent project. Studies will be performed at mid-term and end-of-semester informal studio showings. One extra session per week to be arranged for focus on music resources.

211 Beginning Dance Composition and Music Resources Fall or spring. 4 credits. Limited to 15 students. Prerequisite: Theatre Arts 210. Concurrent enrollment in a dance technique class at the appropriate level is required. Registration only through department roster in 301 Helen Newman Hall. M W 6:30–8 J. Finch. A continuation of Theatre Arts 210.

230 Introduction to Theatre History Fall or spring. 3 credits. T R 10:10–11:25 Staff. A survey of the history of the theatre from its origins to the present day. Special attention will be paid to the evolution of the theatre as a performance art and to the changing social functions of the theatre. Representative plays will be read and discussed in their theatrical context.

237 Opera (also Music 274) Fall. 3 credits. M W 12:20–1:30 Staff. A team-taught introduction to major repertory works, with discussion of texts and theatrical performance as well as music. Operas surveyed will span the period from Mozart to modern times, with emphasis on works by Mozart, Verdi, and Wagner. Video recordings will be an integral part of the courses; optional trips to live performances will be scheduled where possible.

240 Introduction to the Theatre Fall. 3 credits. T R 8:40–9:55 Staff. A survey of the elements of drama and theatre, intended to develop appreciation and rational enjoyment of the theatre in all its forms. Not a production course.

250 Fundamentals of Theatre Design/Technology Fall or spring. 4 credits. Not open to first-term freshmen. M W F 2:30–4:25 Lec-tab. An introduction to design and technical processes in the theatre, with particular attention to the unique collaboration of playwright, director, designer, and technician. Lectures, discussions, and extensive project work will relate the visual principles of designing scenery, costumes, and lighting to the production techniques by which designs are realized on the stage. This course is prerequisite to all higher-level courses in design and technology for the theatre.

251 Production Laboratory II Fall or spring. 1–3 credits. May be repeated for credit. Prerequisite: Theatre Arts 151 or permission of instructor. Orientation meeting in Willard Straight Theatre at 7:30 p.m. on the first Tuesday of classes. D. Hall, P. Gill, J. Johnson. Specialized instruction and specific responsibilities in production positions such as light-board operator, wardrobe mistress, and set or properties-crew head, often preceded by initial exposure to specific areas of scenery, costumes, and lighting, to develop technical skill required by such positions.

272 Music and the Dance (also Music 272) Spring. 3 or 4 credits. Prerequisite: permission of instructor. T R 11:15–12:30 R. Harris-Warwick. This course will explore selected topics in the interrelations between music and dance in the Western tradition. Some of the areas to be examined include the influence of dance movement on musical composition, composition-chorographer relationships, and a comparison of music composed for dancing with dance music composed for listening. Examples will be drawn from the Renaissance, the baroque period, and a modern era. Students will be asked to pursue an independent project.

280 Introduction to Acting Fall or spring. 3 credits. Each section limited to 16 students. Registration only through department roster in 110 Lincoln Hall. Secs 2–7 will meet the first day of class in 301 Lincoln Hall. M W 2:30–4:25 (primarily for prospective majors and those interested in extended study of acting), A. Van Dyke. Sec 15, T R 12:20–2:15, staff. Introduction to the problems and techniques of acting through history, theory, and practice. Appreciation of the actor's function as a creative artist and social interpreter through selected readings, lectures, and play attendance. Examination of the actor's craft through improvisation and exercises in physical, emotional, and intellectual skills.

281 Acting I—Basic Technique Fall or spring. 3 credits. Each section limited to 14 students. Prerequisites: Theatre Arts 280 and auditions. Registration only through department roster in 110 Lincoln Hall. T R 12:20–2:15. E. Newman, or T R 2:30–4:25, B. Levy. Practical exploration of the actor's craft through improvisation and exercises in physical and psychological action; problems in the use of imagination, observation, and research as tools for exploring the script.

282 Introduction to Voice and Speech for Performance Fall. 2 credits. Limited to 12 students. Primarily for department majors. Registration only through department roster in 110 Lincoln Hall. M W 2:30–4:25 E. Newman. Study and practice in the development of vocal technique with emphasis on tone quality, breathing, alignment of the body, and speech practice of standard American English pronunciation.


287 Summer Acting Workshop Summer. 3 credits. Limited to 16 students a section. Fee for theater admissions, $10. An introduction to the processes of acting. Practice in training techniques, rehearsal procedures, and methodology. Productions of the Hangar Theatre Company attended and used as performance examples. Includes visits by guest artists and Hangar Theatre Company members.

300 Independent Study Fall or spring. 1–4 credits. May be repeated for credit. Limited to upperclass students working on scholarly or artistic projects. Permission will be granted only to students who present an acceptable prospectus and who have secured the agreement of a faculty member to serve as supervisor for the project throughout the term. Students must submit written proposal to the department office and to the Office of Records and Scheduling along with registration forms.

304 Ballet III (also Physical Education 434) Fall and spring. 1 credit. May be repeated for up to 4 credits. Prerequisite: Physical Education 431 or permission of instructor. M W F 3:05–4:35. J. Finch. Study and practice of traditional training exercises and the classical ballet vocabulary: work is done on strengthening the body and using it as an expressive instrument.

306 Modern Dance III (also Physical Education 436) Fall and spring. 1 credit. May be repeated for up to 4 credits. Prerequisite: Physical Education 432 or permission of instructor. M W 4:45–6:15 J. Finch. Study and practice of training exercises and movement phrases in a modern dance vocabulary: work is done on strengthening the body and using it as an expressive instrument.

307 Asian Dance and Dance Drama (also Asian Studies 307) Fall. 3 credits. May be repeated for credit. Section 1: Indian Dance. Section 2: Japanese Noh Theater. Section 3: Indonesian Dance Theater. Hours to be arranged. Staff. Readings, lectures, and practice sessions. On Fridays there will be lectures, demonstrations, and discussions. Videotapes and films will be shown. The Monday and Wednesday classes will consist of learning basic movement vocabulary and dances. No previous experience in dance is necessary.

308 Modern Dance IV (also Physical Education 438) Fall and spring. 1 credit. May be repeated for up to 4 credits. Prerequisite: Theatre Arts 306 or Physical Education 436 or permission of instructor. T R 4:45–6:15 J. Finch. Continuation of Theatre Arts 306.

310 Advanced Dance Composition Fall or spring. 4 credits. Prerequisite: Theatre Arts 210 or 211 or permission of instructor. Hours to be arranged. Staff. Further problems in composition for groups.

311 Film and Performance Fall. 4 credits. Prerequisite: permission of both instructors. Previous work in either film or dance is expected. M W 10:10–12:05. M. Rivchin and staff. This course is designed to encourage interdisciplinary connections among the students of the theater, dance, and film programs in the Department of Theatre Arts. Each fall, the course will focus on one program (dance, acting, or directing) and how it relates to film and video media. Through hands-on use of the department's 16- and 15-inch portable video equipment, students will execute studies in various styles of documentation of the performing arts and go on to explore ways of integrating the two mediums into performance. Primarily geared toward production and performance, the course will include readings, lectures, and films on the history of such collaborative work. Students will be encouraged to experiment together to create original work. An informal showing of the student work will be presented at the end of the semester. Cotaught by members of the dance and film faculty, this semester's work will emphasize formal concepts shared by the two media: time, motion, and space, and composition, editing, and choreography. Studies will include styles and effects of dance documentation, cline-dance, and original collaborative work.
312 Physical Analysis of Movement Fall. 3 credits. Not offered 1987–88; next offered 1988–89. T R 1:25–2:40. J. Moronghen. This course is an examination of human movement with particular attention to dance movement. Readings in Swearigard's Human Movement Potential. Guest lectures by experts in anatomy and health areas. Practical and laboratory work.

314 History of Dance I Fall. 3 credits. T R 3:05–4:20. Staff. A survey of the history of dance from ancient times to the Renaissance with emphasis on the development of theatrical forms in Western civilization.

315 History of Dance II Spring. 3 credits. T R 3:05–4:20. Staff. A survey of the history of Western theatrical dance from the Renaissance to contemporary times.

318 Historical Dances Spring. 2 credits. Prerequisite: Ballet II or Modern Dance II. Not offered 1987–88. P. Lawer. A sampling of the social dances from the Renaissance to the present, with emphasis on pinpointing basic differences in movement and customs in the various periods. A major part of class time will be spent learning and performing the dances.

325 Classic and Renaissance Drama (also Comparative Literature 352) Spring. 4 credits. Not offered 1987–88. M W F 1:25. A. Caputi. A study of a major tradition in Western drama from the beginnings among the Greeks to the Renaissance in England and Spain. The work will consist of both lectures and discussions, focusing primarily on a close reading of the plays. But we shall also give attention to the particular conditions of production and to social and political contexts. Among the authors to be read will be Aeschylus, Sophocles, Euripides, Aristophanes, Marlowe, Shakespeare, and Lope de Vega.

326 European Drama, 1660 to 1900 (also Comparative Literature 353) Fall. 4 credits. Not offered 1987–88. M W F 12:20. Staff. Readings from major dramatists from Corneille to Chekhov, including such authors as Moliere, Congreve, Marivaux, Goldoni, Gozzi, Schiller, Kleist, Gogol, Ostrovski, and Ibsen.

327 Modern Drama (also Comparative Literature 354) Spring. 4 credits. M W 2:30–3:45. M. Hays. Readings in European drama from Ibsen to the present.

331 The Classical Theatre Fall. 4 credits. Prerequisite: Theatre Arts 230 or permission of instructor. Not offered 1987–88. M W F 11:15. Staff. An examination of major developments in the theatre—acting, staging, dramaturgy—and the historical background to these developments in Greece and Roman society. Representative plays will be read and discussed in their theatrical context.

332 The Medieval and Renaissance Theatre Spring. 4 credits. Prerequisite: Theatre Arts 230 or permission of instructor. Not offered 1987–88. A intensive study of the cultural conditions, plays, and performance situations that mark the revival of the theatre in Europe in the period between the tenth and early seventeenth centuries. Representative plays will be read and discussed in their theatrical context.

333 English and European Theatre, 1660–1800 Spring. 4 credits. Prerequisite: Theatre Arts 230 or permission of instructor. Not offered 1987–88. M W 2:30–3:45. A study of theatrical styles and production modes. Topics include the English restoration and French neoclassical theatres, the European court theatre, and the rise of standing commercial theatre companies. Representative plays of the period will be read and discussed in their theatrical context.

334 Romantic and Early Modern Theatre Spring. 4 credits. Prerequisite: Theatre Arts 230 or permission of instructor. Not offered 1987–88. A study of the development of the English and European theatre from 1800 to the early years of the modern theatre. Topics include romanticism in the theatre, the nineteenth-century commercial theatre, and the work of the independent theatre between 1878 and 1914.

335 The Modern and Contemporary Theatre Fall. 4 credits. Prerequisite: Theatre Arts 230 or permission of instructor. Not offered 1987–88; next offered 1988–89. T R 10:10–11:25. M. Hays. The history of theatres and theatrical productions in Europe from the early modern theatre to the present day.

336 American Drama and Theatre Fall or summer. 4 credits. Prerequisite: Theatre Arts 230 or permission of instructor. Not offered 1987–88. A study of the American theatre and representative American plays, with emphasis on drama from O'Neill to the present.

338 Japanese Theatre (also Asian Studies 338) Fall. 3 credits. W 2:30–4:40. K. Brazzell. A study of traditional forms of Japanese theater. Topics will include ritual and theatre, noh and kyogen, kabuki and the puppet theatres, and contemporary theatrical use of traditional-forms. Special emphasis will be placed on dramaturgy, acting styles, performance aesthetics, and theories of performer training.

348 Playwriting Fall. 4 credits. Prerequisite: permission of instructor. T R 2:55–4:10. Staff. A laboratory for the discussion of student plays. Following exercises in dramatic structure and technique, students will be expected to write two or three one-act plays.

349 Advanced Playwriting Fall. 4 credits. Prerequisite: Theatre Arts 348. T R 2:30–3:45. Staff. A continuation of Theatre Arts 348, culminating in the composition of a full-length play.

351 Production Laboratory I Fall or spring. 1–3 credits. May be repeated for credit. Prerequisite: Theatre Arts 251 or permission of instructor. Orientation meeting in Willard Straight Theatre at 7:30 p.m. on the first Tuesday of classes. Some production experience in advanced positions in design and/or technology. These include full responsibility for a smaller production assignment, major responsibilities as an assistant on a major production, or significant responsibilities as major crew head.

354 Stagecraft: Scene and Lighting Spring. 3 credits. Prerequisite: Theatre Arts 250 or permission of instructor. M W 10:10–12:05. Staff. Lectures, discussion, and projects on theatre architecture and equipment; scenic construction, mechanics, and painting; lighting techniques and practice. Students are encouraged to complement this course with 1 or 2 credits of appropriate production lab.

356 Stagecraft: Costumes Fall. 3 credits. Prerequisite: Theatre Arts 250 or permission of instructor. M W 10:10–12:05. J. Johnson. Lectures, discussion, and projects in costume patternmaking, cutting, and construction; tailoring techniques; fitting; and makeup. Students are encouraged to complement this course with 1 or 2 credits of appropriate production lab.

362 Lighting Design and Technology Fall. 4 credits. M W 12:20–2:15. P. Gill. An exploration of the role of light as an expressive design medium for the interpretation of plays in the theatre. Will explore the visual nature and dramatic impact of light, the design process and its associated communication techniques, and the influence of professional practices on lighting design.

364 Scene Design and Technology Spring. 4 credits. Prerequisite: Theatre Arts 250 or permission of instructor. M W 12:20–2:15. Scene design faculty. A study of basic principles and technology of scenery for the theatre. Will explore the design process, use of research and imagery, techniques of design construction, and materials and associated tools for the realization of designs on the stage.

366 Costume Design/Technology Fall. 4 credits. Prerequisite: Theatre Arts 250 or permission of instructor. T R 9:20–11:15. D. Martin. An introduction to costume design that concentrates on script and character analysis, period research, the use of the elements of design, developing figure drawing and painting skills, analysis of the theatrical style, and an understanding of the theatrical process. Project work includes both the rendering of design projects and actual costume construction.

370 Stage Management Fall. 1 credit. Prerequisites: Theatre Arts 240 or 250. T R 9:20–11:15. P. Guion. Introduction to the concepts and techniques of stage management as they relate to specific areas of production. Development of communication skills relevant to the role of stage manager and each area of production. Development of understanding of the production process as experienced in the position of stage manager or assistant.

372 English Drama (also English 372) Spring. 4 credits. Not offered 1987–88. Major events in the English theatre from the Middle Ages to the beginning of the twentieth century. Plays by Marlowe, Shakespeare, Jonson, the Wakefield Master, Dryden, Wycherly, Congreve, Sheridan, Shelley, Shaw, and others. Dramatic texts, theatrical conventions, social conditions, and their interrelationships.

374 Introduction to Film Analysis: Meaning and Value Summer or fall. 4 credits. T R 10:10–12:05. D. Freidcerkens. Consideration of the ways films generate meaning and value of the ways we attribute meaning and value to films. Discussion ranges over commercial narrative, documentary, and personal film types.

375 History and Theory of the Commercial Narrative Film Fall. 4 credits. Fee for screening expenses, $10 (this fee is paid in class). Not offered 1987–88; next offered 1988–89. T R 1:25–4:25. Consideration of the broad patterns in the history of the commercial narrative film, viewed as an artistic medium and as a system requiring the massive consumption of artifacts. Emphases include the early articulation of a cinematic language, realism as an artistic style, the nature and functions of popular film, and modernism. Major figures include Griffith, Eisenstein, Murnau, von Stroheim, Dreyer, Chaplin, Renoir, Ford, Hitchcock, Welles, Antonioni, Fellini, Bergman, Bunuel, Resnais, Godard, and Herzog.

376 History and Theory of Documentary and Experimental Film Fall. 4 credits. Fee for screening expenses, $10 (this fee is paid in class). T R 1:25–4:25. D. Freidcerkens. Documentary figures covered include Vertov, Flaherty, Grierson, Ivens, Lorentz, Riefenstahl, Capra, and others. Dramatic texts, theatrical conventions, social conditions, and their interrelationships.
twenties, the movement toward documentary in the thirties, and American experimental and personal film from the forties to the present.

377 Fundamentals of 16-mm Filmmaking Fall or spring. 4 credits. Limited to 12 students. Prerequisite: permission of instructor. Fee for maintenance costs, $25 (this fee is paid in class). The average cost to each student for materials and processing is $200–250.


A hands-on course in the basics of 16mm filmmaking techniques, requiring no prior experience. Each student will complete a number of short film projects to explore narrative, experimental, documentary, animation, and abstract genres. A longer, final sound film project will be screened publicly.

[378 Russian Film of the 1920s and French Film of the 1960s Spring. 4 credits. Prerequisite: Theatre Arts 375. Fee for screening expenses, $10 (this fee is paid in class). Not offered 1987–88; next offered 1988–89.


An intensive treatment of two distinct periods of innovation in film theory and history. Emphasis on the relationship between theory and practice. Major figures include Vertov, Dovzhenko, Godard, Truffaut, Resnais, Robbe-Grillet, Eustache, Rivette, and Bresson.]

379 International Documentary Film from 1945 to the Present Spring. 4 credits. Prerequisite: Theatre Arts 376. Fee for screening expenses, $10 (this fee is paid in class).


Emphasis on the contemporary documentary film as a sociopolitical force, as an ethnographic tool within and without a filmmaker’s own culture, and as an artistic form with a distinct history and set of theoretical questions. Major figures, structures, and movements covered include Jennings, Rouquier, Leacock, Malle, Rouch, Solanas, national film boards, Challenge for Change, direct cinema, cinema verite, and revolutionary documentary of the Third World.

380 Acting II—Characterization Fall. 3 credits. Limited to 12 students. Prerequisites: Theatre Arts 281 and permission. Registration only through department roster in 110 Lincoln Hall.

T/R 10:10–12:05. Spring, staff.

Scene study and improvisational work designed to develop sensitivity to use of the voice, and communicative action and emotional support in creating a role. Emphasis on text analysis, use of imagery in handling dramatic language, and exercises in emotional and sense memory.

381 Acting III—Styles Fall. 3 credits. Limited to 10 students. Prerequisites: Theatre Arts 380 and permission. Registration only through department roster in 104 Lincoln Hall.


Practice and application of skills and methods to various styles of dramatic literature; practical exploration of historical and social influences as determinants of style.

385 Skills, Techniques, and Approaches to Performance Spring. 2 credits. Prerequisites: Theatre Arts 281 or permission of instructor.

Hours to be arranged. D. Feldshuh.

This course will use the talents of visiting theatrical artists to Correlated and present to the student an opportunity to learn a variety of performance approaches and techniques. The course will be divided into sections with guest artists teaching such subjects as mask work, clowning, auditioning, and other aspects of performance training. Resident faculty will also participate in their own areas of specialty and interest to create a course that combines these resources and spatializes the theatre to the resident faculty. The exact subject matter will change from year to year depending on the guest artists in residence.

388 Fundamentals of Directing I Spring. 3 credits. Limited to 12 students. Prerequisite: permission of instructor.


Focused, practical exercises to teach the student the fundamentals of stage business and techniques that bring a written text to theatrical life. A core objective of the course is to increase the student’s awareness of why and how certain stage events communicate effectively to an audience. Each student will direct a number of exercises as well as a short scene.

410 Individual Problems in Composition Fall or spring. 3 credits. Prerequisite: Theatre Arts 310 or permission of instructor.

Hours to be arranged. Staff.

Individual problems in dance composition.

[418 Seminar in History of Dance Spring. 3 credits. Prerequisite: Theatre Arts 315 or permission of instructor. Not offered 1987–88.]

[431 Theory of the Theatre and Drama I Fall. 4 credits. Prerequisite: some theatre history and dramatic literature work at the 300 level or permission of instructor. Not offered 1987–88.]


A study of various theories of dramatic form and theatrical presentation from Aristotle and Horace to Goethe and Schiller.

[432 Theory of the Theatre and Drama II Fall. 4 credits. Prerequisite: some theatre history and dramatic literature work at the 300 level or permission of instructor. Not offered 1987–88.]


An examination of the dramatic scripts produced during the Irish renaissance at the turn of the century and during the Harlem renaissance in the 1920s. Assignments will include de facto only the plays themselves but also some readings in history and in ethnic theory. Of particular interest will be the extent to which the theatrical companies involved (most prominently the prominent female dramatists of the Krigwa Players) achieved forms genuinely alternative and/or oppositional to the dominant culture forms of their periods and the interaction of cultural and political attempts at self-definition.

389 Special Topics: Women Playwrights in the American Theatre, 1910–1960 Fall. 4 credits. Prerequisite: some work in theatre history or dramatic literature at the 300 level or permission of instructor.


A survey of the social themes and technical innovation of American women playwrights from 1910 to 1960. The course begins with some attention to starring vehicles of American women playwrights from 1910 to 1960. Theatre and society in an effort to test the critical capacities of this position with respect to theatrical life. A core objective of the course is to increase the student’s awareness of why and how certain stage events communicate effectively to an audience. Each student will direct a number of exercises as well as a short scene.

451 Production Laboratory IV Fall or spring. 1–4 credits. May be repeated for credit. Prerequisites: Theatre Arts 351 or permission of instructor. Orientation meeting in Willard Straight Theatre at 7:30 p.m. on the first Tuesday of classes.

D. Hall; P. Gill; J. Johnson.

Production experience involving full design and/or technical responsibility for a play or dance. Work will be supervised in a tutorial manner by appropriate faculty.


M/W 12:20–2:15.

Selected topics in the history of lighting design, the aesthetics of light and their role in play analysis, and the contribution of light to the establishment and manipulation of dramatic space.]

[464 Seminar in Scene Design Fall. 4 credits. May be repeated for credit. Prerequisite: Theatre Arts 364 and permission of instructor. Not offered 1987–88.


Selected topics in the history of design style, the changing nature and functioning of stage spaces, and the role of the scenic space in the establishment of a dramatic strategy for the play in production.]

466 Seminar in Costume Design Spring. 4 credits. May be repeated for credit. Prerequisite: Theatre Arts 366 and permission of instructor.

M/W 12:20–2:15. Staff.

This course builds on the Costume Design I topics (script analysis, period research, the use of the elements of design, development of costume rendering and painting, and understanding the theatrical process) by stressing the practical production situations that influence design and the relationship between designer, director, and the scenography team. Theatrical styles and actual production work are explored in more depth. Extensive project work includes both the rendering of design projects and actual costume construction.

474 Advanced Film Projects Summer. 4 credits. Limited to 12 students. Prerequisites: Theatre Arts 280, 281, or 377 or equivalent and permission of instructor.

Maintenance fee, $25. M. Rivchin.

Students work in small crews to produce a short dramatic film and/or a short documentary film, using suitable sound and lighting equipment. Equipment is provided, but students must pay for film and processing (average cost, $125).

475 Seminar in the Cinema (also College Scholar Seminar) Spring. 4 credits.


Topic for 1987: image is psyche. "Know thyself": this has been called our culture’s most enduring psychological need, and it has been frequently offered as the raison d’etre for liberal studies. C. G. Jung’s answer to how you might "know thyself" is based on his claim that "image is psyche" and its informing metaphor is depth. The seminar will trace the elaborations of his position in Jung, James Hillman, Edward Casey, Mary Watkins, and others. It will also test the critical capacities of this position with respect to film images given us by Bergman, Fellini, Brakhage, Roeg, Gunvor Nelson, Suzan Pitt, Larry Jordan, Bruce Baillie, and others. The manner in which Jung’s claim might provide an archetypal and imaginal alternative to current approaches to liberal studies will be asked throughout the seminar: the nature of education will thereby become a central theme of the semester’s work.

477 Intermediate Film Projects Spring. 4 credits.

Limited to 4 students. Prerequisites: Theatre Arts 377 or equivalent, and permission of instructor. Fee for maintenance costs, $25 (this fee is paid in class). The
average cost to each student for materials and processing is $200–$250. Students retain ownership of their films.


The development and completion of individual projects, with emphasis on personal and documentary modes. Includes preparation of an original script or storyboard, direction, cinematography, synchronous-sound recording, editing, and follow-through to a composite print.

495 Honors Research Tutorial Fall or spring. 1–4 credits. Prerequisites: senior standing and departmental approval as an honors candidate. Hours to be announced. Staff.

Methods and modes of research for honors project.

496 Honors Thesis Project Fall or spring. 1–4 credits. Prerequisites: senior standing and departmental acceptance as an honors candidate. Hours to be announced. Staff.

Presentation and presentation of honors thesis or practicum.

496 Directing II Fall or spring. 4 credits. Enrollment strictly limited. Prerequisite: Theatre Arts 280, or 398 or equivalent and permission of instructor.


The course builds on the staging techniques learned in Fundamentals of Directing I. In this course each student will direct a series of projects and public presentations focusing on specific directorial challenges. The student will develop an increased ability to articulate and defend directorial choices and learn to work with actors on a diverse range of material. The course is open to graduate and undergraduate students. Directors will cast from a company of actors to be audited early in the semester. Each actor in the company will earn two credits as part of Theatre Arts 155.

499 Seminar in Directing Fall or spring. 1–4 credits. Prerequisites: Theatre Arts 280, 398, or 498, or permission of instructor.

Hours to be arranged. D. Feldshuh.

This seminar will give the student the opportunity to direct a full evening of theatre. It will also involve an internship with a prominent director on campus and a final paper focusing on a specific aspect of directing.

575 American Mime Orientation I Fall. 2 credits. Prerequisite: Theatre Arts 280 and permission of instructor. Students enrolled in American Mime must contact the Department of Theatre Arts about supplies one month before the beginning of classes.

Registration only through department roster in 110 Lincoln Hall.

F 2–3:30. P. Curtis and other teachers from the American Mime Theatre.

American Mime is a unique performing art created by a particular balance of playwriting, acting, moving, pantomime, and theatrical equipment. It is a complete theatre medium defined by its own aesthetic laws, terminology, techniques, script material, and teaching methods, in which nonspeaking actors, in characteristic performance, transform the symbolic activities of American Mime through movement that is both telling and beautiful.

576 American Mime Orientation II Spring. 2 credits. Prerequisite: Theatre Arts 575 or permission of instructor. Registration only through department roster in 110 Lincoln Hall.

F 2–4:35. P. Curtis and other teachers from the American Mime Theatre.

A continuation of Theatre Arts 575.

638 Seminar in Dramatic Criticism Fall. 4 credits. Prerequisite: permission.


Semiotics as a critical tool.


From Hegel to Foucault: theories of history and theories of the drama.

639 Tragedy and Philosophy Spring. 4 credits. R 2:30–4:30. S. Goodhart.

Netzsch's famous phrase, in The Gay Science, on the "death of God" pulls the rug out from under a long tradition of Pantheistic humanist thinking. We will study in this course some of the ways in which Greek tragedy (and to some extent later drama) has already mounted in full the same challenge that the philosophic and literary tradition succeeding tragedy works systematically to subvert and replace. We will read plays of Sophocles, Euripides, and Aeschylus (although we will also conclude the course with a look at plays by Shakespeare and Beckett), and we will read in this context some of the major philosophical treatises of tragedy both among the Greeks (Pisto and Aristotel) and since the beginning of the nineteenth century (Hegel, Kierkegaard, Nietzsche, Heidegger, and others). There will be no exams. Students will be asked to write a series of short (and one long) critical papers.

653 Myth onto Film (also Anthropology 653) Fall or spring. 4 credits. Open to undergraduate and graduate students with permission of the instructor. Prerequisite: some knowledge of any one of the following: anthropolgy, film, graphics, drawing, and painting. Not offered 1987–88, offered 1986–87.


In myths, whales fly, pebbles throw themselves across streams, and trees are transformed into women. Toward the end of visualizing myths— in particular the myths of other people— we explore the possibilities of animated film. The technique used is cameraless animation; that is, we draw and paint, frame by frame, directly onto movie film. The intellectual problem is to visualize the myth so that it is comprehensible to us but are not thought to be of us. Reading includes introductory works on both myth and animation, and there is background reading on the particular myth that is committed to film.

660 Visual Ideology (also German 660) Spring. 4 credits. Hours to be arranged. G. Waite.

Some of the most interesting and influential approaches to visual objects have come from the peripheries of traditional art history and criticism. This seminar will analyze some of these approaches so as to understand the interactions between the disciplines of art history and criticism and such fields as philosophy, psychanalysis, film and literary theory, and sociology. More specifically, we will attempt to advance a dialectical interpretation of the ideological and sociopolitical determinations on the reciprocal production and consumption of visual artifacts. Readings taken from Berlitz, John Berger, Benjamin, Bryson, T. J. Clark, Freud, Gadammer, Carlo Girzbn, Haldinjollicau, Hauser, Klingender, Kristeva, Lacan, Lenin, MacCaibe, Marx, Marx, Nietzsche, Ocheg, Piekhanov, Max Raphael, Sontag, and Wilin.

Examples of artifacts for analysis will be drawn primarily from the history of oil painting, but we will discuss other types as well, including photography and cinema.

676 New German Cinema (also Theatre Arts 676) Spring. 4 credits.


The course will examine in depth major films and filmmakers who are considered a part of the German new wave cinema (Fassbinder, Schiidnardt, Von Trotta, Kluge, Sander, Herzog, Wenders, etc.). Of special interest will be the historical impact of these films in the contexts of West Germany, Europe, and the United States.

678 Theory and Practice of Modern Drama (also Theatre Arts 678) Spring. 4 credits.

W 3:35 D. Bathrick.

The course will explore different theories of modern drama, focusing on the plays of Antonin Artaud, Brecht, and others. This course is designed to discuss these on the basis of a number of representative works of modern drama. The point will be to trace the interchange between theory formation and dramatic practice.

685 Gramsci and Cultural Politics Spring. 4 credits.


The modern transnational-capitalist state rules not only by domination and coercion but by the "noncoercive coercion" of cultural hegemony. What is to be done? What is the proper role of intellectuals (and who and what is an "intellectual")? In this pressing matter of cultural politics? How do "leftist" cultural critics, theorists, and artists living under late capitalism relate as individuals and collectively to nascent socialist countries? What is the relationship of intellectuals to political parties? We will begin to answer these questions by reading the political and cultural writings of Antonio Gramsci—whether Gramsci is best understood as a "Hegelian" or as an "extension of Leninist orthodoxy." And we will study the response of a variety of critics, artists, and cultural practices to Gramsci's challenge: the neorealist film La Terra trema, Gritti's Art and the Italian Novecento, the paintings of Cremonini, Fowles's novel Daniel Martin, Pasolini's poem cycle "Ashes for Gramsci," the mass-media analyses of Parenti (Inventing Reality) and Kukarkin (The Passing Age), the political philosophy of Laclau and Mouffe (Hegemony and the Socialist Strategy), the theory and practice of "low-intensity conflict" as developed by the CIA and the NSC, and the cultural theories of Williams (Marxism and Literature) and Said (The World, the Text, and the Critic).

699 Seminar in the Theories of Directing Spring. 1–3 credits. Permission of instructor and director.

Hours to be arranged. S. Cole.

700 Introduction to Research and Bibliography in Theatre Arts Fall. 1 credit. Enrollment limited to students in Theatre Arts 633 or 636.


A study of methods and materials relevant to the solution of problems in theatre arts, including introduction to standard research sources, problems of translation, and preparation of theses and publications.

701 Stage Movement and Combat Fall and spring. 2 credits each semester. May be repeated for credit.

Limited to students in M.F.A. professional actor training.


Development of the physical body for expression through various techniques and practice, including effort-shape; improvisation; composition; modern dance and ballet; period dance; stage combat technique in foil, epee, saber, and dagger; tumbling; aikido and stage fighting; combat choreography.

730 Dramatic Text Analysis Fall and spring. 2 credits each semester. May be repeated for credit.

Limited to students in M.F.A. professional actor training program.


M W 1–2:30. Staff.

An examination of selected works of dramatic literature for theatre artists. Intensive study of the play's text for techniques in interpretation, character development, plot articulation, and the aesthetics of prose and poetry for performance.

751 Rehearsal and Performance Fall. 2 credits. May be repeated for credit.

Limited to students in M.F.A. professional actor training.


Study, development, and performance of assigned roles.
781 Acting Technique II Fall and spring. 2 credits each semester. Limited to students in second-year M.F.A. professional actor training. Prerequisite: Theatre Arts 780. Not offered 1987—88.

783 Voice Technique II Fall and spring. 2 credits each semester. Limited to students in second-year M.F.A. professional actor training. Prerequisite: Theatre Arts 782. Not offered 1987—88.

785 Speech Technique II Fall and spring. 2 credits each semester. Limited to students in second-year M.F.A. professional actor training. Prerequisite: Theatre Arts 784. Not offered 1987—88.
M W 10:45—12: A. Van Dyke. Refined sound distinction and execution; study of dramatic texts in prose and poetry to develop techniques in scansion, emphasis, rhythm, range, and melody.

880 Master's Thesis
990 Doctoral Thesis and Special Problems

Turkish
See Department of Near Eastern Studies.

Ugaritic
See Department of Near Eastern Studies.

Ukrainian
See Modern Languages, Literatures, and Linguistics.

Vietnamese
See Modern Languages, Literatures, and Linguistics.

Writing Program
See John S. Knight Writing Program, p. 10.

Yiddish
See Department of Near Eastern Studies.

Special Programs and Interdisciplinary Studies

Africana Studies and Research Center
The Africana Studies and Research Center is concerned with the examination of the history, culture, intellectual development, and social organization of Black people and cultures in the Americas, Africa, and the Caribbean. Its program is structured from an interdisciplinary and comparative perspective and presents a variety of subjects in focal areas of history, literature, social sciences, and Swahili language and literature.
The center offers a unique and specialized program of study that leads to an undergraduate degree through the College of Arts and Sciences and a graduate degree, the Master of Professional Studies (African and Afro-American), through the university's Graduate School.
A student may major in Africana studies; however, another attractive alternative is the center's joint major program. This program enables the student to complete a major in any of the other disciplines represented in the college while at the same time fulfilling requirements for a major in Africana Studies. This requires only a few more credits than is usually the case when one completes a single major course of study. Courses offered by the center are open to both majors and nonmajors and may be used to meet a number of college distribution requirements, such as freshman writing seminars, language (Swahili), expressive arts, social sciences, and history.
The center also brings distinguished visitors to the campus, sponsors a lecture series, and has on occasion arranged study tours to Africa and the Caribbean.
The Africana Major
The undergraduate major offers interdisciplinary study of the fundamental dimensions of the Afro-American and African experiences. Because of the comprehensive nature of the program, it is to the students' advantage to declare themselves Africana majors as early as possible. The following are prerequisites for admission to the major.

Students should submit:
1) a statement of why they want to be an Africana studies major;
2) a tentative outline of the area of study they are considering (African or African-American) for the undergraduate concentration; and
3) a full transcript of courses taken and grades received.
The center's undergraduate faculty representative will review the applications and notify students within two weeks of the status of their request.

After acceptance as a major in the Africana Center, a student must maintain a C+ cumulative average in the center's courses while completing the major program. The Africana major must complete 36 credits in courses offered by the center, to include the following four core courses: AS&RC 231, 290, 360, and 431. Beyond the core courses, the student must take 8 credits of courses numbered 200 or above and 15 credits numbered 300 or above. Within this selection the student must take at least one of the following AS&RC courses: 203, 204, 283, or 301. The program of an undergraduate major may have a specifically Afro-American focus or a specifically African focus.

Joint Majors
The center encourages joint majors in the College of Arts and Sciences and in other colleges. Joint majors are individualized programs that must be worked out between the departments concerned. The center's undergraduate faculty representative, Professor Cross, will assist students in the design and coordination of joint major programs. However, in any joint major program, the center will require at least 16 credits be taken in Africana studies courses, including AS&RC 290.

Double Majors
In the case of double majors (as distinct from joint majors) students undertake to carry the full load of stipulated requirements for a major in each of the two departments they have selected.

Honors
The honors program offers students the opportunity to complete a liberal research thesis, a field project in conjunction with a report on the field experience, or a project or experiment designed by the student. The requirements for admission to the honors program for all students—regular majors, joint majors, and double majors—are a B- cumulative average in all courses and a B+ cumulative average in the center's courses. Each student accepted into the honors program will have an honors faculty committee consisting of the student's adviser and one additional faculty member, who is responsible for final evaluation of the student's work. The honors committee must approve the thesis or project before May 1 of the student's junior year. The completed thesis or project should be filed with the student's faculty committee by May 10 of the senior year.

Distribution Requirement
Two Africana Studies and Research Center courses from the appropriate group may be used in fulfillment of one of the following distribution requirements:


Freshman writing seminars: AS&RC 100.

Note: Students who are not AS&RC majors may petition to satisfy a second requirement with center courses if they are carrying a heavy program at the center.

Language Requirement
Swahili fulfills the College of Arts and Sciences language requirement. Successful completion of AS&RC 131, 132, 133, and 134 provides qualification in Swahili. African majors are not required to take Swahili, but the center recommends the study of Swahili to complete the language requirement.

Courses

132 Swahili Spring. 4 credits. Prerequisite: Swahili 131.
W R 12:20—2:15. A. Nanji. Continued study of the basic grammatical formation of the language and the introduction of reading material ranging from songs to short stories. A great many drills help develop the student's comprehension. Swahili tapes are highly used.
133 Swahili Fall. 4 credits. Prerequisites: Swahili 131 and 132. W R 2:30-4:25; language lab to be arranged. A. Nanji. Advanced study in reading and composition.

134 Swahili Spring. 4 credits. W, hours to be arranged. A. Nanji. This course is designed for freshmen and sophomores that will be devoted to the history of Black education and problems of public schools in Black communities.

171 Black Families and the Socialization of Black Children Fall. 4 credits. T R 2:55-4:10. W. Cross. Survey of the political dimensions of the Black experience, covering such issues as (1) race and intelligence, (2) Black identity, (3) Black family structure, (4) Black English, (5) Black middle class, and (6) nature of Black psychology.

172 The Education of Black Americans: Historical and Contemporary Issues Fall. 4 credits. T R 2:55-4:10. W. Cross. A course designed for freshmen and sophomores that will be devoted to the history of Black education and contemporary issues in Black education, such as the struggle for independence and the development of independent Black schools, and problems of public schools in Black communities.


202 Swahili Literature Fall. 4 credits. Prerequisite: Swahili 131. Offered on demand. A. Nanji. Students gain mastery over spoken Swahili and are introduced to the predominant Swahili literary forms.

203 History and Politics of Racism and Segregation Fall. 4 credits. M W F 1:25. C. Mbata. A cross-cultural study of historical context, of the evolution of thought and practice in southern Africa and North America.

204 History and Politics of Racism and Segregation Spring. 4 credits. M W F 1:25. C. Mbata. This course will deal with the historical patterns of racism and segregation in southern Africa and North America as case histories. The study will be undertaken within a theoretical framework that broadly defines racism and segregation and their implications.

208 Gender, Race, and Medical "Science" Fall. 3 credits. T R 11:40-12:55. G. Fraser. The course will examine the social construction of race and gender in the medical sciences from the turn of the century to the present. Beginning with readings that propose a new view of scientific medicine as a system of signs and symbols and as culturally embedded, we will proceed to an examination of some of the following topics: racism and experimentation; the treatment of venereal disease and tuberculosis; the demise of social childbirth; the body as a medical product, menstruation as pathology; the monitored mind; women and psychiatry; the political economy of health care, medical authority; the training of medical students; political anatomy of the body; sites of resistance; and alternative systems: cross-cultural case studies.

219 Issues in Black Literature Fall. 4 credits. Offered alternate years. An examination of literature written for Black children, including an analysis of the literature as it pertains to Black life from 1960 to the present. Students write a pamphlet containing their essays, fiction, and poetry and compile a bibliography of literature for Black children.

231 Black Political Thought Fall. 3 credits. T R 11:40-12:55. J. Turner. This is an introductory course that will review and analyze the major theoretical and ideological formulations developed and espoused by African-Americans in the struggle for liberation. This semester we will focus specifically on the political philosophy and historical significance of Malcolm X. and the work and movement of Marcus Garvey, as the prime movers of nationalism and pan-Africanism among Black people in this century. Such themes as slave resistance, pan-Africanism, emigration, anti-imperialism, socialism and internal colonialism, and the political and social views of Black women will be discussed. Black political thought will be viewed in its development as a response to concrete conditions of oppression and expression.

283 Black Resistance: South Africa and North America Fall. 4 credits. Offered alternate years. C. Mbata. A study of Black political movements in South Africa and North America and their responses to the situations of race relations that formed the contexts of their operations.

285 Black Theater and Dramatic Literature Fall. 3 credits. W 2:30-4:25. W. Branch. This course is an introduction to the history of Black drama. It will provide the means through which students can cultivate their interests in Black dramatic literature and production techniques. Each student will participate in the production of a play to be performed during the semester. There will be at least one trip to New York City to see a Black theater production.

290 The Sociology of the Black Experience Fall. 3 credits. T R 1:25-2:40. J. Turner. An introductory course to the sociology of the Black experience and to the field of Afro-American studies. Required for all undergraduate students majoring at the Africana Center. The course surveys the early culture and development of Black people and their role in world civilization and concentrates on the cultural heritage and social experience of Black people in the United States in particular.

301 Oppression and the Psychology of the Black Social Movement Spring. 4 credits. Offered alternate years. J. Turner. The focus of the course will be conversion experiences within the context of social movement. The development of political groups (for example, the Black Panther Party) and outstanding activist-intellectuals (such as Malcolm X) are used as reference points for discussion of social movement theory.

302 Social and Psychological Effects of Colonialization and Racism Spring. 4 credits. Offered alternate years. Staff.

303 Blacks in Communication Media and Film Workshop Spring. 3 credits. The course is designed to explain why Africa's public administrations have generally failed to move from the colonialist ethos to becoming primary instruments for initiating and guiding the processes of development. The reality of colonialism was bureaucratic centralism—the closest approximation to the ideal type of a pure administrative state specializing in law and order. Colonial administrations resembled armies in their paramilitary formation and ethos and were, indeed, a number of cases, the instur, and military men. Much attention focuses on the internal characteristics of bureaucratic organizations in Africa and their relationship to their social and political environments.

344 Afro-American Perspectives in Experimental Psychology (also Psychology 345) Spring. 3 or 4 credits. Prerequisite: an introductory course in psychology or AS&SC 171. Offered alternate years.

346 African Socialism and Nation Building Spring. 4 credits. An exploration and critical analysis of the various theories of African socialism as propounded by theorists and practitioners. Those ideas, extending from Nyere's Ujamaa (for example, traditional social and economic patterns of the African society) to Nkrumah's scientific socialism (such as the desirability and practicality of the Marxian type of socialism in Africa) are compared.

350 The Black Woman: Social and Political History Spring. 3 credits. Offered alternate years. Hours to be arranged. This course will address the social organizations, political and social views of Black women in the nineteenth and twentieth centuries (e.g., Ida B. Wells, Mary Church Terrell, Ella Baker, Mary McLeod Bethune, Eleanor Holmes Norton, Angela Davis), the emergence of Black feminism, and the various political and social controversies surrounding the relationship of Black women to both the civil rights and Black power movements.

351 Politics and Social Change in the Caribbean Fall. 4 credits. M W 10:10-12:05. L. Edmondson. A study of the historical, geopolitical, political, economic, and social (including race and gender) forces bearing on the domestic and international experiences of Caribbean societies. Special attention will be given to conflicting definitions and perceptions of the Caribbean; contending theories of Caribbean social structure and models of development; the continuing salience of struggles for change and transformation; prospects of regional integration; and Caribbean challenges to the global system, especially with regard to the region's relations with the United States in the context of the East-West conflict and its position in the Third World in the context of the north-south cleavage.

352 Pan-Africanism and Contemporary Black Ideologies Spring. 4 credits. Offered alternate years. An historical study of Pan-Africanism as a movement and analyzes the literature and activities of early Black pan-African theorists and movements.

African Background to the Twentieth Century)

361 Introduction to Afro-American History (from transformation of Afro-Americans from chattel slaves to freedom through the process of emancipation and the transformation of Afro-Americans from first-class citizens. The purpose is to understand internal dynamics of the Black experience from African origins to the age of segregation.

370 Afro-American History: The Twentieth Century
Spring. 3 credits.
M W F 1:25-1:55. R. Harris.
Examines the transition of Afro-Americans from countryside to city through the process of migration and urbanization and their transformation into industrial laborers. Probes the transition from segregation to civil rights through the process of protest and the transformation of Afro-Americans from second-class into first-class citizens. The purpose is to understand historical antecedents for the current socioeconomic, political, and cultural status of Afro-Americans.

381 Contemporary African History
Spring. 3 credits.
A survey of the current problems on the African continent.Preference is given to Africa south of the Zambezi River. The focus is on the internal dynamics of the Black experience from African origins to the age of segregation.

382 Comparative Slave Trade of Africans in the Americas
Fall. 3 credits.
The focus is on the eighteenth- and nineteenth-century slave societies in Virginia and South Carolina and the eighteenth-century slave societies in San Domingue or Haiti and to some extent in Jamaica. The slave society in Cuba during the last part of the nineteenth century is studied.

400 Political Economy of Ideology and Development in Africa
Spring. 4 credits.
An exploration of the processes of African underdevelopment, ranging from historical foundations to contemporary international dynamics. Rival theories of underdevelopment, contending models of development, and competing ideologies will be explored. Compare African postures as manifested in the “Lagos Plan of Action for the Economic Development of Africa, 1980–2000” and in the north-south dialogue will also be assessed.

405 Political History of the Age of Booker T. Washington and W. E. B. DuBois
Spring. 4 credits.
A review of the intellectual and political history of the Black experience in the United States from 1890 to the eve of World War II. Although the course concentrates on two of the outstanding Black historical figures of the period, Booker T. Washington and W. E. B. DuBois, other philosophers and leaders within Black social and political history will be examined—including Marcus Garvey, T. Thomas Fortune, A. Philip Randolph, Charles S. Johnson, William Monroe Trotter, and James Weldon Johnson. Major Black issues, such as the intellectual debates between DuBois and Washington, and DuBois versus Garvey, will constitute a critical part of the discussion.

410 Black Politics and the American Political System
Fall. 4 credits.
The course is designed to engage students in a survey and analysis of the theoretical and empirical basis of Black politics in America. It is a sociological investigation and evaluation of the variety of practical political activities among Black people in the United States.

420 Urbanization and the Black Community: Issues in Social Policy
Spring. 4 credits.
The socioeconomic conditions of the Black urban community will be the central focus of the course. Community development models will be explored in relationship to the social needs of the Black populations. The changing configuration of internal organization of the Black community nationally will be examined.

422 African Literature
Fall. 4 credits.
M W 11:30–1:10. A. Adams.
Through the reading of twentieth-century novels and short stories from English-speaking and French-speaking sub-Saharan Africa, students will consider such questions as the influences of colonialism and independence will have on their society, the contribution of the writer to the development of Africa. Representative authors to be studied will include Leye, Oyono, Achebe, Soyinka, Armaah, Ahmed, and Ngugi. All works will be read in English.

425 Advanced Seminar in Black Theater and Dramatic Literature
Spring. 4 credits.
This course involves the study and analysis of selected plays from the Black theater repertoire, together with their relationship to key aspects of the Black experience in America. Materials will range from some of the earliest plays produced by Black American playwrights, in the mid-1800s, through dramas surfacing early in the twentieth century, on into the blossoming of Black dramaturgy during the mid-1900s and a current wave of works by such contemporary playwrights as Amira Baraka, Ed Bullins, Charles Fuller, and S. Williams. A field trip to a Black theater attraction actually on the boards in New York City is anticipated.

431 History of Afro-American Literature
Fall. 4 credits.
An extensive examination of the impact that Afro-American literature has had on describing, explaining, and projecting the Afro-American experience from 1619 to the present.

432 Modern Afro-American Literature
Spring. 4 credits.
A study of fiction by Black writers, focusing on the political and sociological component that influenced the development and growth of Black writing in relationship to literary themes and attitudes current in specific periods and movements from post–World War I to the present.

455 Modern Caribbean Literature
Spring. 4 credits.
W 2–4:25. A. Adams.
This course will examine the prose literature of the Caribbean islands. Through the reading of several novels and short stories from the various languages and cultural strains that comprise the Caribbean societies, students will study the points of commonality and the diversity within this body of literature. The recurrence of certain historical, social, and cultural issues that have formed the multi-ethnic Caribbean peoples will be analyzed in their varying manifestations across the linguistic and other boundaries to uncover the underlying shared experience.

460 African Philosophy and the Origins of Major Western Religions
Fall or spring. 4 credits.
The overall objective of this course is to develop in the student an understanding of the origins of the major Western philosophical, theosophical, and magic-religious teachings that were responsible for producing what is today called Judaism, Christianity, and Islam. From this foundation, the student will be made of the most basic works and teachings from the Nile Valley and the Great African Lakes, and African religions will be compared to the adoptions in Hebrew, Christian, and Moslem religions, as well as what is today called Greek philosophy.

475 Black Leaders and Movements in Afro-American History
Spring. 4 credits.
T R 3:35. R. Harris.
Analyzes the personalities, ideas, and activities central to the struggle for Afro-American liberation from the eighteenth century to the present. Examines theories of leadership and the structure of protest movements with the goal of understanding current leadership needs and trends among Afro-Americans.

483 Themes in African History
Fall. 4 credits.
M W 1:25–3:20, plus one hour to be arranged. C. Mbata.
Topics: 1895–1987: Women in African history. Designed to expose the student to what has been referred to as the particular aspects of African history. The survey approach will be adopted in the treatment of selected themes: political, economic, and social dimensions of the work done in auxiliary disciplines. The study will be along the following lines: (a) selected African heroines; (b) women in traditional African societies; and (c) African women in the twentieth-century industrial societies.

484 Politics, Conflict, and Social Change in Southern Africa
Fall or spring. 4 credits.
T 1–7, p.m. L. Edmonston.
The focus is on escalating conflicts and ongoing transformations in South Africa and the increasingly salient issue of United States relations with an apartheid regime. Topical emphases include the heightening contradictions of apartheid; the rising tide of Black resistance; women under and against apartheid; South Africa’s relations with its neighbors; geopolitical, economic, and racial dimensions of the American connection; the disinvestment-divestment debate; and the Reagan administration’s “constructive engagement” policy under challenge. Instructor’s lectures will be supplemented by films, class discussion, and guest lectures.

485 Racism, Social Structure, and Social Analysis
Spring. 4 credits.
An examination of the social structure of American society and the relationship of racial and class categories to social stratification. An analysis of power structures and the social salience of socioeconomic connections of government decision makers and the corporate structure is developed.

490 Advanced Reading and Research Seminar in Black History
Spring. 4 credits.
The seminar is designed to help students acquaint themselves with the available sources of information and materials in Black history, as well as make the maximum use of their own inclinations and interests in unearthing the material and creating a body of comprehensive conclusions and generalizations out of them.

495 Political Economy of Black America
Spring. 4 credits.
An examination of the role that Black labor has played in the historical development of United States monopoly capitalism, and imperialism. Emphasis is on the theory and method of political economy and a concrete analysis of the exploitation of Black people as slave labor, agricultural labor, and proletarian labor.

498–499 Independent Study
Fall or spring. 4 credits.

500 Political Theory, Planning, and Development in Africa
Spring. 4 credits.
T R 11:15–12:45.
The course explores the processes of development of Africa from the epoch of slavery through colonial and neocolonial phases of domination,
drawing on the assumptions of "underdevelopment" theory a la G. Frank, Walter Rodney, and others. It then takes up the differential content and emphasis on socialistic and capitalistic strategies by highlighting the interaction of political and economic forces. Case studies are drawn from Ghana, Kenya, and Tanzania.

505 Workshop In Teaching about Africa 4 credits. Prerequisites: AS&RC 203 and 204 or AS&RC 360 and 361 or permission of instructor. Offered alternate years. C. Mbata.

510 Historiography and Sources: The Development of Afro-American History Fall 4 credits. Prerequisite: upperclass or graduate standing or permission of instructor. T. J. Harris.

Studies the way Black historians in particular have explained the Afro-American past. Examines the development of writing on Afro-American history from the earliest writers to the present. Seeks to determine the principles for interpreting Afro-American history. An interdisciplinary program drawing on the assumptions of "underdevelopment" with both the private and public sectors of the economy as an economic and political factor in the Third World, their relations with the host government, and their interaction of political and economic forces. Case studies are drawn from several countries in particular the Colleges of Arts and Sciences, Agriculture and Life Sciences, and Human Ecology.

The concentration committee, consisting of faculty from each of the major colleges from which courses in the concentration are drawn, serve as advisers in the program. The committee is administered through the biology and society major (office: 275 Clark Hall, 255-6042).

515 Comparative Political History of the African Diaspora 4 credits. Prerequisites: upperclass or graduate standing or two of the following courses: AS&RC 203, 204, 263, 360, 361, 475, 484, 490. Offered alternate years.

520 Historical Method, Sources, and Interpretation Fall 4 credits. Prerequisite: upperclass or graduate standing or two of the following courses: AS&RC 203, 204, 263, 361, 475, 484, 490. Offered alternate years. C. Mbata.

550 Transnational Corporations in Africa and Other Developing Countries Spring 4 credits. Prerequisites: upperclass or graduate standing or two of the following courses: AS&RC 203, 204, 361, 475, 484, 490. Offered alternate years. C. Mbata.

551 Political History of Social Development in the Caribbean Fall 4 credits

M. W. L 10:10–12:05. L. Edmondson. A study of the historical, geostrategic, political, economic, and social (including racial and cultural) forces acting on the domestic and international experiences of Caribbean societies. Special attention will be given to conflicting definitions and perceptions of the Caribbean; contending theories of Caribbean social structure and models of development; the continuing salience of struggles for change and transformation; prospects of regional integration; and Caribbean challenges to the global system, especially with regard to the region's relations with the United States in the context of the east-west conflict and its position in the Third World and in the context of the north-south cleavage.

571 Graduate Seminar in Black Psychology Fall 4 credits. Prerequisite: permission of instructor. R. W. Cross.

This is an upper-level undergraduate and graduate seminar devoted to psychological issues in the Afro-American experience. This seminar will examine the theoretical and empirical literature of Black family—kinship systems and Black self-concept.

589–599 Independent Study 589; fall; 599; spring. Limited to Africana Studies and Research Center graduate students. Africana Center faculty.

Agriculture, Food, and Society Concentration


Agriculture, food, and society is an interdisciplinary concentration that is designed to introduce students to the study of agricultural and food issues from diverse perspectives within the liberal arts. The concentration seeks to make available to students a coherent program of study in which the role of agriculture in modern or prehistorical—historical and developed or developing societies can be understood in biological, social, scientific, and humanistic perspective. The concentration draws on courses in several colleges—in particular the Colleges of Arts and Sciences, Agriculture and Life Sciences, and Human Ecology.

The concentration committee, consisting of faculty from each of the major colleges from which courses in the concentration are drawn, serve as advisers in the program. The committee is administered through the biology and society major (office: 275 Clark Hall, 255-6042).

Basic Requirements

The requirements for the agriculture, food, and society concentration are designed to ensure a broad background in the biological, socio-economic, and humanistic dimensions of agricultural and food issues. These requirements include foundation courses in biology plus a minimum of six courses and 18 credits of electives drawn from a list of courses given below.

Students enrolling in the concentration should take the following foundation courses in biology to prepare themselves for course work in agricultural science: a two-semester introductory biology sequence selected from Biological Sciences 109-110, 105-106, or 101–102 plus 102–104. (Advanced placement in biology with a score of 4 or 5, or Biological Sciences 100, offered during the six-week Cornell summer session for 7 credits, also satisfies the biological sciences requirement). These courses may be used to meet group 1 (physical or biological sciences) distribution sequence requirements in the College of Arts and Sciences.

It is recommended (but not required) that students in the agriculture, food, and society concentration elect one or more freshman writing seminars with agriculturally related content to meet basic college requirements for graduation. Agriculturally related freshman writing seminars would include those such as the following, which are being offered in 1987-88:

- Biology and Society 104 Ecosystems and Ego Systems Spring 3 credits
  M. Gilliland
- Biology and Society 108 Living on the Land Fall 3 credits
  A. Boehm
- Biology and Society 109 Women and Nature Spring 3 credits
  A. Boehm
- Biology and Society 113 Writing as a Naturalist Fall or spring 3 credits
  L. Wilson

For further information and a complete list of courses that can be used to fulfill the concentration requirements, students should contact the biology and society office, 275 Clark Hall, 255-6042.

American Indian Program

C. Heth, director (300 Caldwell Hall, 255-6587).

The American Indian Program (AIP) is a multi-disciplinary, intercollege program consisting of instructional, research, and extension components. The program's instructional core consists of courses focusing on American Indian life with an emphasis on the Iroquois and other Indians of the Northeast. Core courses are supplemented by a variety of offerings from several departments. Further development of courses is expected in a number of departments. Cooperative extension is assisting in efforts to provide services to Indian communities in New York State. Research initiatives will be directed toward working with Indian groups in areas such as wildlife management, agriculture, industrial and labor relations, and social and economic development.

The university has a commitment to broadening the educational opportunities and experiences of students from all backgrounds. The AIP offers courses that enhance the awareness of all students of the unique heritage of American Indians. Students are challenged by such topics as the sovereign rights of Indian nations and the contemporary relevance of Indian attitudes toward the environment.

Another objective of the AIP is to assist Indian groups and organizations in their efforts to address the issues they face. The thrust of the AIP's research and extension efforts is directed at developing solutions to problems identified by Indian people. In this way the AIP can serve as a catalyst to stimulate the application of institutional expertise and resources to community needs.

During the summer the AIP sponsors a program designed to educate elementary and secondary school teachers about the history and culture of American Indians with particular emphasis on Indians of New York State. The program also provides an opportunity for these teachers to develop new materials and strategies for teaching about American Indians and to gain skill in presenting these materials and using these teaching strategies in a classroom situation.

American Indian Studies Concentration

American Indian studies offers an interdisciplinary approach to the study of American Indian life. Course work in various colleges and departments of the university will provide a broad base for understanding the past, present, and future of Indian people. Students selecting a concentration in American Indian studies must take five courses from those listed below. At least one course must be selected from each group. All course work must be approved by an adviser from the program.

For full descriptions of the following courses, consult the listings under individual departments.

The Indian Traditions

Anthropology 230 Cultures of Native North America

Anthropology 242 American Indian Philosophies: I. Power and World Views (also Rural Sociology 242)

Anthropology 354 The Peopling of America

Music 223 Music of the American Indian

Indians in Transition

Anthropology 318 Ethnography of the Iroquois (also Agriculture and Life Sciences 318)

History 209 Political History of Indians in the United States
The biology and society major is offered to students with approval of an American Indian studies faculty member.

Center for Applied Mathematics

The Center for Applied Mathematics administers a broadly based interdepartmental graduate program that provides opportunities for study and research over a wide range of the mathematical sciences. This program is based on a solid foundation in analysis, algebra, and methods of applied mathematics. The remainder of the graduate student’s program is designed by the student and his or her Special Committee. For detailed information on opportunities for graduate study in mathematics, students should contact the director of the Center for Applied Mathematics, Sage Hall.

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

A listing of selected graduate courses in applied mathematics can be found in the description of the center on p.8.

Biology and Society Major


The biology and society major is offered to students enrolled in the College of Arts and Sciences and the College of Human Ecology. Undergraduates in the College of Agriculture and Life Sciences can develop an approved sequence of courses from the biology and society curriculum under general studies. The major is coordinated for students in all colleges through the biology and society office. Students can get information, specific course requirements, and application procedures for the major from the office in 275 Clark Hall.

Because the major is multidisciplinary, students must attain a basic understanding of each of the several disciplines it comprises. These include introductory courses in the fields of ethics, history or philosophy, biochemistry, ecology, genetics, and statistics. In addition, majors are required to take a core course and must develop a concentration: a coherent and meaningful grouping of seven courses representative of their special interest in biology and society. Students should develop the theme of the concentration area and select the courses in consultation with a member of the biology and society faculty.

Admission to the Major

Students should have completed a year of college-level biology and submit an application during their sophomore year. Juniors are considered on a case-by-case basis. Upper-division applicants should realize the difficulties of completing the major requirements in less than two years. The application includes (1) a one-to-two-page statement explaining the student’s intellectual interests in the biology and society major and why the major is consistent with the student’s academic goals and interests; (2) a selected theme or concentration in the major; (3) a tentative plan of courses fulfilling biology and society requirements, including courses taken and the student’s plans to take; and (4) a transcript of work taken at Cornell University, current as of the date of application.

Acceptance into the major requires completion of the course sequence in introductory biology. Students in the process of completing this prerequisite may be admitted to the major on a provisional basis. It is the student’s responsibility to assure that final acceptance is granted on completion of the introductory biology sequence. Only introductory biology through the major is a prerequisite for acceptance, students will find it useful to have completed some of the other requirements (listed below) by the end of their sophomore year, preferably in the first semester. There are student advisers and faculty available (according to posted office hours or by appointment) in the biology and society office, 275 Clark Hall, or 278 Clark Hall (advising office) to answer questions and to provide assistance.

Major Requirements

1) Basic courses
   a. Biological sciences 100 or 101-104 or 105-106
   b. College calculus (one course): Math 106, 108, or 111 or any higher-level calculus course

2) Foundation courses (should be completed by the end of the junior year): one course in each subject area
   a. Ethics: Bio&Soc 205 (also Bio Sci 205 and Phil 245) or Bio&Soc 206 (also Bio Sci 206 and Phil 246)
   b. History of philosophy: Phil 381 or Phil 389 or Bio&Soc 288 (also Hist 288 and Bio Sci 202)
   c. Biochemistry: Bio Sci 231, 330, or 331
   d. Ecology: Bio Sci 261 or 262
   e. Genetics: Bio Sci 281 or 282 or Bi Br 225

3) Core courses
   a. Bio&Soc 301 (also Anthr 301 and Bio Sci 301)
   b. Ecology and society majors are required to take this course for 4 credits
   c. Bio&Soc 306 (also HSS 306) Enrollment in this class is strongly recommended for biology and society majors

4) Concentration (seven courses above the 100 level)
   a. Humanities elective or issues (one course)
   b. Natural sciences issues (one course)
   c. Biology elective (two courses from biological sciences, agricultural sciences, human development and family studies, psychology, agronomy, animal science, entomology, food science, microbiology, natural resources, plant pathology, or veterinary medicine). These courses must have substantial biology content. All not in these divisions and departments satisfy this requirement.
   d. Social sciences issues (one course)
   e. Social sciences elective (one course)
   f. Senior seminar (one course in the senior year)

Courses change yearly.

Concentration Areas for the Major

Students are encouraged to develop their own themes in a concentration area. Examples include biochemistry and public policy; biotechnology and society; agriculture, environment, and society; health and society; and human development and society. Sample concentration areas are available in the biology and society office.

Independent Study

Projects under the direction of a biology and society faculty member are encouraged as part of the program of study in the student’s concentration area. Applications for research projects are accepted by individual faculty members. Students may enroll for 1–4 credits in Biology and Society 375 (Independent Study) with written permission of the faculty supervisor and may elect either the letter grade or the S-U option. Students from the Colleges of Arts and Sciences and Agriculture and Life Sciences may elect to do an independent study project as an alternative to, or in advance of, an honors project. Applications and information on faculty research, scholarly activities, and undergraduate opportunities are available in the biology and society office. 275 Clark Hall. Independent study credits may not be used in completion of the major requirements.

Honors Program

The honors program is available to biology and society majors from the Colleges of Arts and Sciences and Agriculture and Life Sciences and is designed to challenge the academically talented undergraduate student. Students who enroll in the honors program are given the opportunity to do independent study and to develop the ability to evaluate research dealing with issues in biology and society. Students participating in the program should find the experience intellectually stimulating and rewarding.

Selection of Students

During the first three weeks of the fall semester senior biology and society majors are considered for entry into the honors program by the Honors Program Committee. Applications for the honors program are available at the biology and society office, 275 Clark Hall. To qualify for the honors program, students must explain how the honors work will fit into their overall program, must have an overall Cornell cumulative grade-point average of at least 3.00 and at least a 3.30 cumulative grade-point average in all courses used to meet the major requirements. Students in the College of Agriculture and Life Sciences must also meet the requirements of that college and be selected by one of the selecting college committees.

If, after admission to the honors program, a student fails to maintain a high scholastic average, or if for any other reason(s) he or she is considered unsuited for honors work, the student reverts to candidacy for the regular bachelor’s degree. The student who does not continue in the honors program receives credit for any work passed in the program but is not eligible for a degree with honors.

Project Requirements

The satisfactory completion of a special project and the writing of an honors thesis are required. The project must include substantial research, and the completed work should be of wider scope and higher quality than the work normally required for an advanced course.
Evaluation and Recommendation

Two copies of the completed and defended thesis (suitably bound in a plastic or hard-covered book) together with the thesis recommendations must be submitted to the Honors Program Committee by the first day of study period of the student's final term.

Following the formal defense of the thesis, the thesis advisers will each submit to the Honors Program Committee a recommendation that includes (1) an evaluation of the honors work and the thesis, (2) an evaluation of the student's academic record in the biology and society major, and (3) a recommendation for or against awarding honors. (For College of Arts and Sciences students, the Honors Program Committee may request for the level of honors proposed must be included.)

Copies of the thesis and recommendations will be circulated to the Honors Program Committee. As the committee may have little knowledge of the subject area of the thesis, letters of recommendation should be carefully prepared to help the committee ensure consistency in the honors program. Unless there is serious disagreement, the recommendation of the advisers should stand. If there is disagreement, the Honors Program Committee will make the decision after consultation with the interested parties.

Freshman Writing Seminars

For up-to-date information consult the John S. Knight Writing Program brochure.

Courses

205 Ethics in Medicine (also Biological Sciences 205 and Philosophy 245) Fall. 4 credits. Limited to 50 students. Open to sophomores, juniors, and seniors; permission of instructor required for graduate students.

T R 10-11:20; disc, plus disc to be arranged.

M. Wachsmuth

Critical analysis of the conceptual frameworks in which ethical problems associated with medicine can be formulated and evaluated. General topics (with sample issues) include basic concepts such as illness, death, autonomy, and personhood (abortion, euthanasia, reproductive technologies), allocation of medical resources (entitlement to health care, access to health care, cost-benefit analysis), and the professional-patient relationship (informed consent, confidentiality, and medical paternalism).

206 Environmental Ethics (also Biological Sciences 206 and Philosophy 246) Fall. 4 credits. Open to sophomores, juniors, and seniors; permission of instructor required for graduate students.

T R 1:25-2:40, plus disc to be arranged.

M. Wachsmuth

Critical analysis of the conceptual frameworks in which policies affecting the environment are formulated and judged. One major component of the course deals with the nature and extent of obligations to spatially distant people, future generations, nonhuman animals, and nonsentient things (e.g., the ecosystem). The other major component of the course deals with the appropriate analysis of the origin and resolution of environmental problems. Topics include individual versus collective responsibility, cost-benefit analysis, and coordination problems.

232 Recombinant DNA Technology and its Applications (also Biological Sciences 232) Spring. 3 credits. Disc limited to 20 students.

Prerequisite: one year of introductory biology.

S-U grades optional.

Lecs, T R 10-11:30. J. P. Proven. An examination of the history of biology emphasizing the interaction of biology and culture. Original writings of biologists constitute the bulk of reading assignments. This course covers the period from classical antiquity to the present, but primary emphasis is on twentieth-century biology.

301 Biology and Society: The Biocultural Perspective (also Anthropology 301 and Biological Sciences 301) Fall. 3 or 4 credits (3 credits by arrangement with instructor). Biology and society majors are required to take the course for 4 credits. 

Prerequisite: one year of introductory biology.

S-U grades optional. This is the core-course requirement for the biology and society major and is also available to other students who have fulfilled the necessary prerequisites.


In modern evolutionary theory, the human biology, behavior, and institutions are understood as the ongoing product of interaction between human biology and culture. The course offers students an introduction to pre-Darwinian and modern views of human nature. After reviewing the pre-Darwinian context and reading The Origin of Species, the course explores attempts at applications of evolutionary analysis to humans and develops a cultural explanation of the persistence of pre-Darwinian elements in many of them.

302 Biology & Society: Institutions, Roles, and Accountability (also Human Service Studies 302) Spring. 3 credits. Prerequisite: introductory biology or permission of instructor.

Lecs, M W F 2-3:00. L. Palmer, C. McClintock. Developments in modern biology are having a profound impact on fundamental institutions such as medicine, religion, the family, and social control processes such as law. The course will analyze institutions whose primary function is regulatory practice (e.g., the Federal Drug Administration), care giving (e.g., health, mental health agencies), policy and legislation (e.g., legislative or executive branch of government), cultural practices (e.g., family, marriage, and education), and social control (e.g., prisons, mental hospitals). Students will study the institutional and legal basis for regulation of professions, individual roles and ideologies in institutions, and the dynamics and techniques for institutional change.

222 Arts and Sciences

Initiative for formulation of ideas, developing the proposal, carrying out research, and preparation of a suitably written thesis. The student, projects will be under the direction of two advisers. Candidates must first find a biology and society faculty member willing to serve as the adviser and, together with the adviser, find a second adviser among the faculty at large. The purpose of the second adviser is to

guarantee expertise in the subject matter covered by
the thesis. Students in the college of Agriculture and Life Sciences will be well advised, however, to provide reviewers for or against awarding honors. (For College of Arts and Sciences students, the Honors Program Committee may have little knowledge of the subject area of the thesis, letters of recommendation should be carefully prepared to help the committee ensure consistency in the honors program. Unless there is serious disagreement, the recommendation of the advisers should stand. If there is disagreement, the Honors Program Committee will make the decision after consultation with the interested parties.

Honors Thesis

Students and their advisers should meet regularly during the period of research and writing for the honors thesis. The responsibility for scheduling these meetings, and for carrying out the research agreed on, rests with the student and the thesis adviser. Students are encouraged to enroll for both terms to give them time to develop a project properly for the thesis. If registering for a two-semester honors project, students must register, twice totaling. When registered for the whole project each term (e.g., 8 credits for the fall term and 8 credits for the spring term). Students should note, however, that Biology and Society 499, because it is a special honors course, is to be taken in addition to those courses that meet the regular major requirements. Honors projects cannot be used to fulfill the senior seminar requirement.

Course Requirements

499 Honors Project

Fall or spring; two-semester projects are acceptable. 3-5 credits each term with a maximum of 8 credits for the entire project. Open only to biology and society honors students in their senior year.

Staff

Students enrolled in Biology & Society 499 will receive a letter grade at the end of their final term, whether or not they complete a thesis and whether or not they are recommended for honors. Students enrolled for the whole year in 499 may receive either a letter grade for both terms or a grade of "I" for the first term with a letter grade for both terms submitted at the end of the second term. When a student is enrolled for two terms, the student and the thesis adviser must reach a clear agreement at the outset as to which grade will be assigned for the first term and in the basis of what sort of work. Most thesis outline and bibliography should be completed during the first term.

288 History of Biology (also History 288 and Biological Sciences 202) Spring. 3 credits. Prerequisite: one year of introductory biology.

S-U grades optional.

Lecs, T R 10-11:30. J. P. Proven. An examination of the history of biology emphasizing the interaction of biology and culture. Original writings of biologists constitute the bulk of reading assignments. This course covers the period from classical antiquity to the present, but primary emphasis is on twentieth-century biology.

201 Biology and Society: Preparation for Research

Fall or spring; 1 credit. Prerequisites: Biology & Society 301 and 306 or concurrent enrollment. S-U grades only.

Disc-sem, M 4-5:30. Fall: H. C. Howland and staff. Spring: J. F. Radebe, J. Staff. For biology and society majors interested in doing independent study or honors work. Faculty presentations on their current research and the methodologies used in their individual areas. Preparation of project outlines and literature review. Fall enrollment is recommended for juniors.

254 Biology and Society: The Biocultural Perspective Fall. 3 credits. Limited to 30 students. Prerequisite: one year of introductory biology. S-U grades optional. This is the core-course requirement for the biology and society major and is also available to other students who have fulfilled the necessary prerequisites.


In modern evolutionary theory, the human biology, behavior, and institutions are understood as the ongoing product of interaction between human biology and culture. The course offers students an introduction to pre-Darwinian and modern views of human nature. After reviewing the pre-Darwinian context and reading The Origin of Species, the course explores attempts at applications of evolutionary analysis to humans and develops a cultural explanation of the persistence of pre-Darwinian elements in many of them.

306 Biology & Society: Institutions, Roles, and Accountability (also Human Service Studies 306) Spring. 3 credits. Prerequisite: introductory biology or permission of instructor.

Lecs, M W F 2-3:00. L. Palmer, C. McClintock. Developments in modern biology are having a profound impact on fundamental institutions such as medicine, religion, the family, and social control processes such as law. The course will analyze institutions whose primary function is regulatory practice (e.g., the Federal Drug Administration), care giving (e.g., health, mental health agencies), policy and legislation (e.g., legislative or executive branch of government), cultural practices (e.g., family, marriage, and education).

327 Health and Disease (also German Literature 327 and Psychology 387) Fall. 4 credits. Common Learning course. Prerequisite: permission of instructor. Limited to 20 students. S-U grades optional. Offered alternate years. Not offered 1987–88; next offered 1988–89. Lect., M W F 1:25–2:25. E. S. Greenblatt. An examination of contemporary medical systems from fetal period through adolescence, with consideration of growth as well as physical and psychological development. Topics will include the history of disease, addiction, and diseases of undernutrition, as well as the culturally shaped response to them.

328 Medical Metaphors and their Cultural Function (also German Literature 328) Fall. 4 credits. Not offered 1987–88. Disc, T 2:30–4:40. S. Gilman. Why is a person we think is an outsider “sick”? We will explore, using literary and medical texts, the nature of metaphor and pathology from the Renaissance to the present, from diseases such as syphilis to the modern backlash: All readings in English.


375 Independent Study Fall or spring. 1–4 credits. Prerequisite: written permission of faculty supervisor. S-U grades optional. Staff.

386 Culture and Human Disease (also Anthropology 386) Fall. 4 credits. Prerequisite: one biology or one anthropology course. Lect., M W F 10:10. M. LaVallee. Explores the interrelationships between human society and the incidence of biological illness. The course focuses upon genetic and behavioral mediation of the immune system, as well as the culturally shaped epidemiology of parasitism, zoonoses, chronic disease, addiction, and diseases of undernutrition, overnutrition, and aging. The socioculture of disease in Southeast Asia, Latin America, and the United States will be emphasized with examples including malaria, influenza, ticks, lactase intolerance, protein-calorie malnutrition, diabetes, cancer, obesity, substance abuse, anorexia, osteoporosis, hypertension, and heart disease.

400 Undergraduate Seminar Fall or spring. Variable credits. May be repeated for credit. S-U grades optional. Staff. From time to time different seminars on topics of interest to undergraduates are offered. Topics and instructors are listed in the Biology and Society supplement issued at the beginning of each semester.


409 Senior Seminar: Human Fertility in Developing Nations (also Sociology 404) Fall. 4 credits. Prerequisite: Sociology 430 or permission of instructor. Offered alternate years. Lect., R 5–5:30. J. M. Stycos. A review of the major literature dealing with the social causation of variation in human fertility. Emphasis will be on international comparisons and on the methodology of field research.

406 Senior Seminar: Issues in Biotechnology, Society, and Law (also Biological Sciences 406) Fall. 4 credits. Limited to 20 students. Prerequisites: a course in genetics and biochemistry, or written permission of instructor. S-U grades optional. There is a fee for course reading material. Not offered 1987–88; next offered 1988–89. Sec., T R 2:30–4:25. J. M. Fessenden-Raden, J. M. Stycos. Human biotechnologies, with their implied power in areas such as medicine and law, may advance more rapidly than the social institutions can productively use and prudently control them. Issues in the use and potential abuse of applications (e.g., DNA fingerprinting, gene therapy, genes as diagnostics) will be explored. Readings are from science, medicine, law, ethics, and public policy. A research paper is required.

407 Senior Seminar: Law, Science, and Public Values (also Government 407) Spring. 4 credits. M W F 2:30–3:30. J. W. Sanders, J. J. Feldman. This course explores the varied interactions between science and the legal process that have developed in recent years as a result of attempts to bring greater public accountability to the use of science and technology. It examines the activities of both legislatures and courts in controlling science and analyzes the values underlying these initiatives. Three major types of science-law interactions form the focus of the course: judicial review of risk-management decisions, and legal control of professional standards in science and technology. Specific topics include the regulation of toxic chemicals and nuclear power, controversies associated with biotechnology, reproductive technologies and biomedical research, and science fraud.

408 Senior Seminar: Agriculture, Society, and Biotechnology (also Rural Sociology 405) Spring. 3 credits. Prerequisites: two courses in the social sciences and three courses in the biological or agricultural sciences. Offered alternate years. Not offered 1987–88. Lect., W 1:25–4:25. F. H. Buttell. An examination of the socioeconomic aspects of biotechnology and the technological change in agriculture in developed and developing countries. Background is provided on specific aspects of biotechnology. The major topics covered include the social organization of genetic engineering research, industry-university relationships, and the impact of genetic engineering on agriculture.

411 Senior Seminar: The Human and Ecological Consequences of Nuclear War (also Peace Studies 402) Fall. 4 credits. Limited to 15 students. Prerequisite: permission of instructor. Offered alternate years; not offered 1987–88. Lect., M. L. Hansen. This course examines the most serious environmental problem today, the total consequence of a large-scale nuclear war. The immediate, direct effects on humans (from blast, thermal radiation, and ionizing radiation) will be considered, along with the longer-term, indirect effects. These will center around the potential climatic impacts associated with a nuclear winter. Also addressed will be the effects from ozone depletion, local and global fallout, genetic alterations, ecosystem imbalances, and other mechanisms. The first part of the course will consist of lectures and discussions from selected readings, and an attempt to formulate some general conclusions about the varieties of these responses.

414 Senior Seminar: Population Policies (also Sociology 414) Fall. 4 credits. Prerequisites: graduate standing or permission of instructor. Offered alternate years. Not offered 1987–88; next offered 1988–89. Lect., W 2:30–4:30. J. M. Stycos. An analysis of in which there is an awareness of the trends in population. Special focus is on government policies and programs to affect demographic trends.

415 Senior Seminar: The Politics of Technical Decisions (also Sociology 515, City and Regional Planning 541, Management NBA 686, Government 628) Fall. 4 credits. Lects., W 2:30–4:25. D. Nekin. Problems of decision-making in technical areas. Drawing from recent risk disputes, we will examine the roles in “technical politics,” the political influence of experts in government, and the problem of expertise in a democratic system.

419 Senior Seminar: Science, Race, Racism: The Response and Resistance to Scientific Racism, 1800–1930 (also Society for the Humanities 419) Fall. 3 credits. Lect. M 12:30–2:20. S. L. Gilman, N. Stepan. An introduction to racial stereotyping in science during the nineteenth and early twentieth centuries; the intertwining of racial with other types of stereotypes (gender, class) and how stereotypes structure the language of science; a study of the responses of stereotyped groups, and an exploration of the varieties of these responses.

426 Medicine and the Law Fall. 4 credits. Prerequisite: Biology and Society 301 or 311 or permission of instructor. Letter grades only. There is a possibility of copying charges associated with this course. Not offered 1987–88. Lects., M T W 2–2:50. L. Palmer, R. Beresford. The role of law in modern medicine (and the related biomedical sciences) will be examined from the perspective of the social functions of law and medicine. A number of policy and ethical issues will be considered, including the role of hospitals and other health organizations in doctor-patient interactions, the social aspects of physician-patient interactions, the effect of medical malpractice on health-care delivery, legal issues in the care of the newborn and health-care decisions for incompetents and terminally ill patients.

428 Senior Seminar: Medical Service Issues in Health Administration (also Human Service Studies 628) Spring. 3 credits. Lects., W 2:30–3:20. V. M. W. Problem. A survey of the issues that affect interactions between the health-care consumer and the health team, including disease processes (how disease occurs and progresses), the health-care team and illness, third-party payment and illness, and resource allocation.

442 Senior Seminar: Social and Political Studies of Science (also Sociology 355 and City and Regional Planning 442) Spring. 3 credits. Lects., W 2:30–4:25. D. Nekin. A view of science less as an autonomous activity than as a social and political institution. We will discuss such issues as secrecy, ethical codes, and equity and social justice issues, the role of experts in society, and the limits to scientific inquiry in the context of the changing relationships between science and the public.

459 Senior Seminar: Risk Management of Toxic Chemicals Fall. 3 credits. Limited to 12 students. Prerequisites: a course in biochemistry or toxicology or approval of instructor. Offered alternate years. Not offered 1987–88; next offered 1989–90. Sec. T 2:30–4:25. J. M. Fessenden-Raden. Select cases of chemical-risk communication and risk assessment will be examined in order to understand the ways in which governments, communities, industries, and individuals will be reviewed. Potential topics to be included are toxic wastes, groundwater contamination, chemical accidents, and community
right-to-know. The roles of social, economic, political, legal, and ethical factors in decision making will be discussed. Readings from the various disciplines, including scientific papers and reports, will provide background for class discussions. A research paper and class presentation are required.)

461 Senior Seminar: Environmental Biology Policy (also Agriculture and Life Sciences 461 and Biological Sciences 461) Fall and spring. 3 credits. Prerequisite: permission of instructor. Sec. R 7:30–9:30 p.m. D. Pimentel. Focuses on complex energy-environmental problems, using a multidisciplinary approach. Task forces of twelve students, representing several disciplines, investigate significant energy-environmental policy problems. Each task force spends two semesters preparing a report for publication modeled after National Academy of Sciences' reports. This is a two-semester course and must be started in the fall.

469 Food, Agriculture, and Society (also Biological Sciences 469 and Agriculture and Life Sciences 469) Spring. 3 credits. Prerequisite: an introductory ecology course or permission of instructor. S-U grades optional. There is a possible fee for course reading material. Lecs. T R 1:25–2:40 plus disc to be arranged. A. G. Power. A multidisciplinary course that deals with the social and environmental impact of food production in the United States and developing countries. Agroecosystems of various kinds are analyzed from biological, economic, and social perspectives. The impacts of traditional, conventional, and alternative agricultural and food technologies are critically examined in the context of developed and developing economies. Specific topics include pest management, soil conservation, farm labor, land reform, biotechnology, and international food policy.

485 Senior Seminar: Human Development in Postindustrialized Societies (also Human Development and Family Studies 485) Spring. 4 credits. A Common Learning Course. T R 2:30–4:25. U. Bronfenbrenner. The course analyzes the implications for human development of the profound economic, technical, and social changes that have been taking place in modern society, with a special focus on the United States. Particular emphasis is placed on the consequences for human development of the powerful interplay between changes in family life, on the one hand, and the major institutions of society such as schools, communities, business and industry, and government on the other. The relations between these domains will be examined as they influence and are influenced by processes of biological and psychological development throughout the life course. The topic will be treated from the perspective of several relevant disciplines, including human biology, developmental psychology, sociology, anthropology, Japanese studies, economics, American history, and European history.

499 Honors Project Fall or spring; two-semester projects are encouraged. 3–5 credits each term with a maximum of 8 credits for entire project. Open only to biology and society honors students in their senior year. Staff.

China-Japan Program

140 Uris Hall


The China-Japan program includes faculty members who have a commitment to teaching and research on China and Japan. The program is interdisciplinary and is organized to encourage and assist students in the study of the two great civilizations of East Asia. In addition to offering a substantial number of courses in the languages of China and Japan, program faculty members cover most of the major disciplines by means of courses given in several departments and by means of seminars that deal with the history, literature, society, culture, and art of East Asia. Undergraduates who wish to concentrate their studies on China or Japan may do so by declaring a major in the Department of Asian Studies and selecting an adviser from the faculty members listed above. Students interested in Chinese and Japanese studies should consult the Annoucement of the Graduate School for further information, students should contact the director or any staff member in the China-Japan Program Office, 140 Uris Hall.

Cognitive Studies


Cognitive studies is comprised of a number of disciplines that are linked by a major concern with such fundamental capacities of the mind as perception, memory, reasoning, language, and motor control. In the College of Arts and Sciences these disciplines are represented in the Departments of Computer Science, Linguistics, Psychology, and Psychology. Elsewhere in the university they are represented in the Department of Human Development and Family Studies (College of Human Ecology) and the Section of Neurobiology and Behavior (Division of Biological Sciences).

The issues addressed in cognitive studies arise at several levels. At the broadest level are problems of characterizing such basic notions as "mind," "knowledge," "information," and "meaning." At a more specific level are questions regarding the abstract operating principles of individual components of the mind, such as the components underlying visual perception, language ability, and understanding of concepts. These principles concern the organization and behavior of the components and also how the components develop and change. And at the most specific level are questions about the properties of the elementary computational structures and processes that constitute the components.

Important insights into issues of these kinds have been achieved in recent years as a result of the various cognitive studies disciplines converging in their theoretical and methodological approaches. It is this convergence, in fact, that warrants grouping the disciplines together under the single term "cognitive studies." Even greater progress can be expected in the future as a consequence of increasing cooperation among the disciplines.

Undergraduate Concentration

H. Kurtzman (psychology), director of undergraduate studies (224 Uris Hall, 252-3820). The undergraduate concentration in cognitive studies 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. It is considered crucial that students gain a strong background in an individual department, independent of their work in the concentration. This background provides both a foundation and a focus for the concentration work.

In light of the importance of a strong background in an individual department, it is required that a student seeking admission to the concentration have completed or plan to complete three courses in one department from among the list of courses below. (Such a student will typically be a major in the department, but being a major is not necessary. The Section of Neurobiology and Behavior counts as a department here.) These three courses are, however, the only requirement for admission. To enter the concentration formally, the student should consult with the concentration director, who will assign the student a concentration adviser (from among the faculty listed above) who has expertise in the student's main area of interest.

The concentration requires that the student take five courses from departments other than the one from which the student takes the three courses needed for admission to the concentration. These five courses may not all be taken from a single department. The student must gain approval for the selection of five courses from the concentration adviser. The five courses will generally be chosen from among the list below, but other courses (including independent study) are permissible in individual cases.

In addition to approving and the student's selection of courses, the concentration adviser serves as a general source of information about the field of cognitive studies, relevant resources around the university, and job and graduate school opportunities.

Graduate Minor

Consult S. Wurster, the program coordinator (225 Uris Hall, 255-6341), for details.

Courses

Interdisciplinary

Linguistics 411/Philosophy 467/Psychology 519 Cognitive Studies: Knowledge, Belief, and Mental Representations. Fall. 4 credits. F. Landman and staff from linguistics, philosophy, psychology, and computer science.

Additional interdisciplinary courses are in preparation.

Computer Science

211 Computers and Programming Fall or spring. 3 credits.

280 Discrete Structures Fall or spring. 4 credits.

310 Data Structures Fall or spring. 4 credits.

381 Introduction to Theory of Computing Fall. 4 credits.

382 Introduction to Analysis of Algorithms Spring. 4 credits.

411 Programming Languages and Logic Spring. 4 credits.

472 Introduction to Artificial Intelligence Spring. 4 credits.

486 Applied Logic (also Mathematics 486) Spring. 4 credits.

Human Development and Family Studies (College of Human Ecology)

333 Cognitive Processes in Development Fall. 3 credits. G. Suci.

431 Learning in Children Fall. 4 credits. M. Potts.
Special Programs and Interdisciplinary Studies

432 Cognitive Development and Education
Spring. 3 credits.
M. Potts.

434 Piaget's Theory of Cognitive Development
Spring. 4 credits.
B. Lust.

436 Language Development (also Psychology
and Linguistics 436) Spring. 4 credits.
B. Lust.

438 Thinking and Reasoning Fall. 3 credits.
B. Kosowski.

Linguistics

101–102 Theory and Practice of Linguistics Fall
and spring. 4 credits each term.
J. Gair and staff.

111 Themes in Linguistics Fall. 4 credits.
Staff.

201–202 Phonetics I, II Fall and spring. 3 credits each term.
J. Kingston.

264 Language, Mind, and Brain Spring. 4 credits.
J. Bowers.

301–302 Phonology I, II Fall and spring. 4 credits each term.
G. N. Clements.

303 Syntax I Fall. 4 credits.
J. Bowers.

304 Syntax II Spring. 4 credits.
J. Huang.

309 Morphology I Fall. 4 credits.
L. Waugh.

310 Morphology II Spring. 4 credits.
J. Bowers.

325 Pragmatics Fall. 4 credits.
S. McConnell-Ginet.

400 Semiotics and Language Spring. 4 credits.
L. Waugh.

401 Language Typology Fall. 4 credits.
C. Rosen.

421–422 Semantics I, II Fall and spring. 4 credits each term.
G. Chierchia, S. McConnell-Ginet.

436 Language Development (also Psychology
and HDFS 436) Spring. 4 credits.
B. Lust.

438 The Visual System Spring. 4 credits.
H. Howland.

396 Introduction to Sensory Systems (also Psychology 396)
Spring. 3 or 4 credits.
B. Halpern.

423 Animal Communication Fall. 3 credits.
C. Hopkins.

492 Sensory Function (also Psychology 492)
Fall. 4 credits.
H. Howland, B. Halpern.

Phases

231 Introduction to Formal Logic Fall or spring.
4 credits.
Fall. H. Hodes; spring. C. Ginet.

261 Knowledge and Reality Fall. 4 credits.
R. Stalnaker.

262 Philosophy of Mind Spring. 4 credits.
S. Shoemaker.

331 Formal Logic Spring. 4 credits.
H. Hodes.

332 Semantics (Philosophy of Language) Fall.
4 credits.
F. Keil.

361 Metaphysics and Epistemology Fall.
4 credits.
R. Stalnaker.

381 Philosophy of Science: Knowledge and
Objectivity Fall. 4 credits.

382 Philosophy and Psychology

389 Philosophy of Science: Evidence and
Explanation Spring. 4 credits.
R. Miller.

436 Intensional Logic Spring. 4 credits.
R. Stalnaker.

437 Problems in the Philosophy of Language
Spring. 4 credits.
H. Hodes.

461 Metaphysics Fall. 4 credits.
C. Ginet.

462 Theory of Knowledge Fall. 4 credits.

Psychology

205 Perception Spring. 3 credits.
J. Cutting.

209 Development Spring. 4 credits.
F. Keil.

214 Knowledge and Reasoning Spring. 3 credits.
C. Kruekans.

215 Psycholinguistics Fall. 3 or 4 credits.
J. Cutting.

305 Visual Perception Fall. 3 or 4 credits.
E. Spelke.

309 Development of Perception Fall. 4 credits.
J. Cutting.

310 The Psychology of Reading Spring. 4 credits.
Staff.

313 Perceptual and Cognitive Processes Fall.
4 credits.
J. Freyd.

314 The Social Psychology of Language Spring.
4 credits.
H. Levin.

316 Auditory Perception Spring. 3 or 4 credits.
F. Keil.

322 Biopsychology of Learning and Memory
Spring. 3 credits.
T. DeVolder.

396 Introduction to Sensory Systems (also Biological Sciences 396)
Spring. 3 or 4 credits.
B. Halpern.

412 Human Experimental Psychology Laboratory
Spring. 4 credits.
J. Freyd.

415 Concepts, Categories, and Word Meanings
Fall. 4 credits.
F. Keil.

416 Psychology of Language Spring. 4 credits.
H. Kurtzman.

417 The Origins of Thought and Knowledge
Spring. 4 credits.
F. Keil.

418 Psychology of Music Fall. 3 or 4 credits.
C. Kruekans.

425 Brain and Behavior Fall or spring. 3 or 4 credits.
B. Finlay.

436 Language Development (also Linguistics 436
and HDFS 436) Spring. 4 credits.
B. Lust.

490 History and Systems of Psychology

499 History and Systems of Psychology
Fall. 4 credits.
H. Levin.

492 Sensory Function (also Biological Sciences
492) Spring. 4 credits.
H. Howland, B. Halpern.

College Scholar Program
Dean Lynne Abel, director, 55 Goldwin Smith Hall,
255-3386
The College Scholar program is described in the
introductory section, p. 99.

Freshman Writing Seminars
For information about the requirements for freshman
writing seminars, see p. 10. For descriptions of seminar
offerings, consult the John S. Knight Writing Program
brochure, available from college registrars in August for
the fall term and in November for the spring term.

Human Biology Program
J. Haas (nutritional sciences), director, N206 Martha
Van Rensselaer Hall, 255-8001, R. Dyson-Hudson
(anthropology), B. Finlay (psychology), J. Fortune
(physiology/women's studies), R. Johnston
(psychology), K. A. R. Kennedy (ecology and
systematics), M. Lavalle (anthropology), D. Levitsky
(nutritional sciences), R. Savin-Williams (human
development and family studies)

Human biology integrates the methods and theories of
many disciplines, such as biological anthropology,
nutrition, neurobiology, psychology, demography,
ecology, genetics, and paleontology into a
comprehensive study of biological diversity in Homo
sapiens. A central focus of this interdisciplinary
approach to the study of the human organism is an understanding of evolutionary processes that gain our biological variation through space and time. The program of study seeks to educate future biological scientists to address the concerns of a society that is beginning to recognize the importance of the scientific community to place its specialized biological knowledge in a broad context. The human biology curriculum is of particular relevance to undergraduate students in premedical and preprofessional programs, biological anthropology, nutrition, human development, ecology and systematics, psychology, physiology, genetics, and the health-related sciences. It serves to bring together students with a common interest in humankind as defined from these diverse fields and to provide a forum for student-faculty interaction on various topics relating to human evolution and biological diversity. Human Biology is not a major but a curriculum of study that provides majors in various departments with a program for selecting elective courses that deal with the biology of the human species. Students in their junior year may develop a program of study in human biology while mapping in a number of different departmental fields.

**Basic Requirements**

The requirements for a program of study in human biology are designed to insure sufficient background in physical sciences and mathematics to enable the student to pursue a wide range of interests in the fields of modern biological sciences, anthropology, and fields related to the evolution and physical diversity of the human species. Adjustments may be made in these requirements, depending upon the student’s academic background and affiliation with colleges and schools within the university.

The basic requirements are one year of introductory biology (Biology Sciences 101—103 plus 102—104 or 105—106 or Biological Sciences 100 offered during the six-week Cornell Summer Session); one year of general chemistry (Chemistry 207—208 or 215—216 or 103—104); one year of college mathematics, including at least one semester of calculus (Mathematics 111—112 or 113—112 or 105—106 or 111—103—105—106); at least one semester of organic chemistry lectures (Chemistry 253 or 257—258 or 269—260); one course in genetics (Biology Sciences 281 or 282); one course in biochemistry (Biology Sciences 330 or 331); two semesters of physics (Physics 207—208 or 123—124 or 101—102). It is recommended that students planning graduate careers in biological anthropology, psychology, and related fields in the medical and nutritional sciences take a course in statistics. Students should consult their faculty adviser in human biology for help in selecting appropriate courses.

Elective courses should be taken that will enable the student to acquire breadth in the subject matter of human biology outside of their departmental major. Therefore only 6 of the 15 human biology elective credits may also be from requirements for the major. Courses should be selected that also provide sufficient exposure to the integration of basic anatomical and physiological sciences with the behavior of individuals and groups within the context of evolutionary theory and ecology. The courses listed below are representative of the offerings in human biology and are included to assist the student in organizing a curriculum of study. They are organized into three groups that reflect the three levels of integration noted above: (1) human anatomy and physiology, (2) human behavior, and (3) human evolution and ecology. Students should choose at least one course from each of these areas of integration. It is anticipated that the student will include in a program of study at least one of the laboratory courses offered. It is expected that a student will take a minimum of 15 credits from among these courses or others that are listed in the brochure available to students upon request.

There is no foreign language requirement for human biology beyond what is dictated by specific departments and colleges. The requirements for the human biology curriculum are set alongside requirements of the undergraduate majors as these are defined by different departments. Students with independent majors may design their own programs of study under the guidelines provided by their college. Although a student may indicate an interest in human biology in the freshman year and be able to obtain early guidance from a faculty adviser representing the curriculum of study, it is more usual for students to establish their course programs in the first semester of the junior year. The student may request one of the faculty advisers in human biology to be the principal adviser; or he or she may have an adviser in the department of the major and seek the advice of a human biology faculty adviser in matters pertaining to satisfaction of the requirements. In certain cases a faculty adviser may represent both the major and the curriculum of study in human biology.

### Courses

**Human Anatomy and Physiology**

- Bio S 214 The Biological Basis of Sex Differences (also Women's Studies 214) Fall. 3 credits.
- Bio S 274 The Vertebrates Spring. 5 credits.
- Bio S 311 Introductory Animal Physiology, Lectures (also Veterinary Medicine 346) Fall. 3 credits.
- Bio S 414 Vertebrate Morphology (also Veterinary Medicine 700) Spring. 3 credits.
- Bio S 474 Laboratory and Field Methods in Human Biology Spring. 4 credits.
- NS 115 Ecology of Human Nutrition and Food Fall or spring. 3 credits.
- NS 222 Maternal and Child Nutrition Spring. 3 credits.
- NS 331 Physiological and Biochemical Basis of Human Nutrition Spring. 3 credits.
- NS 361 Biochemistry and Human Behavior (also Psychology 361) Fall. 3 credits.
- NS 441 Nutrition and Disease Fall. 4 credits.
- Psych 322 Hormones and Behavior (also Biological Sciences 322) Spring. 3 or 4 credits.
- Psych 425 Brain and Behavior Fall or spring. 3 or 4 credits.
- Vet M 331 Medical Parasitology Fall. 2 credits.

**Human Behavior**

- Anthr 285 Monkeys, Apes, and People: The Comparative Biobehavior of Primates Spring. 3 credits.
- Anthr 476 Human Nature: An Evolutionary Perspective Fall. 4 credits.
- Bio S 301 Biology and Society I: The Biocultural Perspective (also Anthropology 301 and Biology and Society 301) Fall. 3 or 4 credits.
- Bio S 427 Vertebrate Social Behavior Fall. 3 credits.
- B&Soc 404 Human Fertility in Developing Nations (also Sociology 404) Fall. 4 credits.
- HDFS 212 Early Adolescence: A Biological Approach Fall. 3 credits.
- HSS 315 Human Sexuality: A Biosocial Perspective Fall, spring, or summer. 3 credits.
- NS 325 Sociocultural Aspects of Food and Nutrition Fall. 2 credits.

**Human Evolution and Ecology**

- Anthr 101 Introduction to Anthropology: Biological and Prehistoric Perspective Fall. 3 credits.
- Anthr 203 Early People: The Archaeological and Fossil Record (also Archaeology 203) Fall. 3 credits.
- Anthr 214 Humankind: The Biological Background Spring. 3 credits.
- Anthr 375 Ecology and Human Food Production Fall. 4 credits.
- Anthr 380 Food, Feasts, Fasts, and Famines: Studies of Culture and Human Nutrition Spring. 4 credits.
- Anthr 386 Culture and Human Disease (also Biology and Society 386) Fall. 4 credits.
- Anthr 476 Human Nature: An Evolutionary Perspective Fall. 4 credits.
- Anthr 677 Seminar in Ecological Anthropology: Food Production and Social Organization Spring. 4 credits.
- Bio S 261 General Ecology Fall or spring. 3 credits.
- Bio S 262 Ecology, Environment, and Society Spring. 3 credits.
- Bio S 275 Human Biology and Evolution Fall. 3 credits.
- Bio S 301 Biology and Society I: The Biocultural Perspective Fall. 3 or 4 credits.
- Bio S 371 Human Paleontology Spring. 4 credits.
- Bio S 378 Organic Evolution Spring. 4 credits.
- Bio S 468 Systems Ecology Fall. 4 credits.
- Bio S 481 Population Genetics Spring. 4 credits.
- Bio S 482 Genetics and Society Spring. 2 credits.
- Bio S 673 Human Evolution: Concepts, History, and Theory Fall. 3 credits.
- B&Soc 404 Energy and Ecological Systems Fall. 3 credits.
- B&Soc 447 History of Biology—Evolution (also History 447) Fall. 4 credits.
- HSS 330 Ecology and Epidemiology of Health Fall. 3 credits.
- Psych 326 Evolution of Human Behavior Fall. 4 credits.
- Soc 430 Social Demography Spring. 4 credits.
Independent Major Program

Dean Lynne Abel, director, 55 Goldwin Smith Hall, 255-3386.

The Independent Major Program is described in the introductory section, p. 99.

351 Independent Study Fall or spring. 1-4 credits. Prerequisite: permission of the program office.

499 Honors Research Fall or spring. 4–8 credits. maximum of 8 credits may be earned for honors research. Prerequisite: permission of program director. Each participant must submit a brief proposal approved by the honors committee.

Intensive English Program

E. Beukenskamp, director.

This full-time, noncredit, non-degree program is designed to meet the requirements of foreign students who need to acquire proficiency in English in order to pursue university-level studies in the United States, as well as for visitors, businessmen, and others seeking competence in the language.

The intensive nature of the program leads to a command of the language in all its aspects—listening, speaking, reading, and writing—in the shortest possible time.

Integrated courses are offered both fall and spring semesters at three levels: beginning (Test of English as a Foreign Language [TOEFL] score below 370), intermediate (TOEFL score below 450), and advanced.

Students who have gained full admission to, or who already are registered in, degree-granting programs at Cornell should consult the section "Modern Languages, Literatures, and Linguistics" for information regarding courses in English as a second language.

The intensive English Program is administered by the Department of Modern Languages and Linguistics, Cornell University, 203 Morrill Hall, Ithaca, New York 14853–4701. U.S.A. Application materials and information are available directly from the program or by calling 607/255-4863.

International Relations Concentration

Peter Katzenstein, faculty coordinator.

Undergraduates interested in an international relations concentration should see Professor Peter Katzenstein (B-7 McGraw Hill).

One of the university’s strongest, most diverse fields is international relations. Cornell offers dozens of courses, in many departments and several colleges, that provide a strong education in the field, including courses in government, economics, history, anthropology, rural sociology, nutrition, modern languages and literatures, international comparative labor relations, and many others too numerous to list and keep current.

The purpose of a concentration is to provide a structure for students who have a general interest in the field or who plan to specialize in careers in international law, economics, agriculture, foreign trade, international banking, government service, international organizations, or another cultural or scholarly activity.

Some students will major in one of the traditional departments: history, government, economics, foreign literature, and so on. Others will design an independent major. Still others will major in a different discipline, perhaps altogether unrelated, but would like to have a basic understanding of international problems.

For students in any of these categories, the requirements for a concentration in international relations are the following six courses or options:

1. Government 181, Introduction to International Relations
2. One appropriate 300-level government course, either in international relations or in the foreign policy of a particular nation
3. Economics 361, International Trade Theory
4. Economics 362, International Monetary Theory
5. History 314, History of American Foreign Policy II
6. Any history course dealing with a modern nation, particularly History 379, War and Society: the Origins of the First World War, 1870–1919

*Numbers 3 and 4 can be replaced by choosing two courses from the following:

a. Economics 371, Public Policy and Economic Development
b. Economics 372, Applied Economic Development
c. Economics 373, International Specialization and Economic Development
d. Economics 374, National and International Food Economics

The typical choices among the sequences listed above would be to study European history and government with Economics 361–362 or Third World history and government with Economics 371–374. Reasonable substitutions can also be arranged.

Students are also urged as strongly as possible to acquire full proficiency in, not merely a passing acquaintance with, a modern foreign language. At least a semester of study abroad is advised.

Center for International Studies

See "Interdisciplinary Centers and Programs," pp. 7–8.

Program of Jewish Studies

S. Katz, director and undergraduate advisor (Near Eastern and Jewish history and religion), S. Bacharach (industrial and labor relations, sociology, Jewish thought and social theory), R. Brann (Hebrew and Arabic literatures), W. J. Dannhauser (Jews and Germans, contemporary Jewish thought, Gershom Scholem), S. L. Gilman (Yiddish literature, German-Jewish history and literature), G. Korman (Holocaust studies, Jewish labor history), A. S. Lieberman (ecology of man and landscape in Israel and the Middle East), D. I. Owen (Near Eastern and ancient Jewish history), D. S. Powers (history of Jews in Islamic lands), G. Rendsburg (biblical studies), E. Rosenberg (Jews in modern European and Anglo-American literature), N. Scharf (Hebrew language), M. Zamir (Shiloah Visiting Professor).

The Program of Jewish Studies is an outgrowth of the Department of Near Eastern Studies. The program has grown out of the conviction that Judaic civilization merits its own comprehensive and thorough treatment and that proper understanding of any culture is inconceivable without adequate knowledge of the language, literature, and history of the people that it created. Accordingly, the offerings in the areas of Hebrew language and literature have been considerably expanded, and courses in ancient, medieval, and modern Jewish history have been added to the program.

Although further expansion of the program is anticipated, it presently enables students to obtain basic instruction and specialization in the fields of Semitic languages; the Hebrew Bible; the apocryphal and Tannaitic literatures; medieval Hebrew literature; modern Jewish thought; modern Hebrew literature; ancient, medieval, and modern Jewish history; and Yiddish language and literature. In some of these fields students may take courses both on graduate and undergraduate levels. Faculty throughout the University provide breadth to the program by offering courses in related areas of study.

Courses Offered 1987–88

Elementary Modern Hebrew I and II (Near Eastern Studies 101–102)

Elementary Modern Hebrew (Near Eastern Studies 103)

Summer

Continuing Hebrew (Near Eastern Studies 104)

Summer

Elementary Classical Hebrew (Near Eastern Studies 121–122)

Society, Economy, and Religion in Ancient Israel: King David's Jerusalem (Near Eastern Studies 125–126) Fall

Jewish identity: Exile and the Search for Modern Jewish Literature (Near Eastern Studies 127) Fall

Introduction to the Turkish Language (Near Eastern Studies 131–132) Fall

Introduction to Near Eastern Civilization (Near Eastern Studies 197) Fall

Intermediate Modern Hebrew (Near Eastern Studies 201–202) Fall

Introduction to the Bible (Near Eastern Studies 223) Fall

Exodus and Conquest (Near Eastern Studies 226) Spring

Genesis (Near Eastern Studies 228) Fall

The Lyrics of Love and Death: Medieval Hebrew Poetry in Translation (Near Eastern Studies 233, Medieval Studies 233, and Comparative Literature 333) Spring

The Holocaust: European Jewry, 1933–1945 (Near Eastern Studies 241) Spring

The History and Archaeology of Ancient Israel to 450 B.C.E. (Near Eastern Studies 243) Spring

Jurisprudence and the Holocaust (Near Eastern Studies 244) Fall

Introduction to Classical Jewish History (Near Eastern Studies 248) Fall

Introduction to Modern Jewish History (Near Eastern Studies 249) Spring

Ancient Near Eastern Studies 261 and Archaeology 275) Fall

Hebrew for Academic Studies (Near Eastern Studies 271–272)

Judaism and Islam in Comparative Perspective (Near Eastern Studies 293 and Medieval Studies 293) Fall

Modern History of the Middle East: Changing Politics, Society, and Ideas (Near Eastern Studies 294 and Government 358) Fall

Advanced Modern Hebrew I (Near Eastern Studies 302) Spring

Elementary Akkadian (Near Eastern Studies 333–334) Spring

Readings in Judeo-Arabic: Medieval Judeo-Arabic and Hebrew Poetics (Near Eastern Studies 432) Spring
Independent Study, Undergraduate Level (Near Eastern Studies 491–492)
Independent Study Honors Seminar (Near Eastern Studies 499)
Independent Study, Graduate Level (Near Eastern Studies 691–692)

Courses Not Offered 1987–88

Elementary Yiddish (Near Eastern Studies 171–172)
Masterpieces of Jewish Literature (Near Eastern Studies 204 and Comparative Literature 204) Spring.
Judaic Literature in Late Antiquity (Near Eastern Studies 225) Fall.
Introduction to the Prophets (Near Eastern Studies 227) Fall.
Introduction to Jewish Mysticism (Near Eastern Studies 229) Fall.
The Hebrew Literary Tradition: A Survey (Near Eastern Studies 231 and Comparative Literature 231) Fall.

Muslim Spain: Literature and Society (Near Eastern Studies 234 and Comparative Literature 234) Spring.
Aramaic (Near Eastern Studies 236) Summer.

Israel: History and Geography (Near Eastern Studies 242) Summer.
The Emergence of the Modern Jew: 1648–1948 (Near Eastern Studies 245) Fall.
Introduction to Biblical Archaeology (Near Eastern Studies 265) Summer.

Agriculture and Society in the Ancient Near East (Near Eastern Studies 264) Fall.
Women in the Hebrew Bible (Near Eastern Studies 292 and Women’s Studies 292) Fall.

Advanced Modern Hebrew II (Near Eastern Studies 302) Summer.
The History and Archaeology of the Ancient Near East (Near Eastern Studies 366 and Archaeology 310) Summer.

Ancient Near Eastern Literature (Near Eastern Studies 332)
Readings in Akkadian Texts (Near Eastern Studies 335–336) Fall.
Ugaritic (Near Eastern Studies 337) Fall.

The Jewish Community throughout History (Near Eastern Studies 343) Fall.
Age of the Patriarchs (Near Eastern Studies 344) Spring.
Anti-Semitism in Germany and the Jewish Response (Near Eastern Studies 349 and German Literature 349) Summer.
The History and Archaeology of Ebla (Near Eastern Studies 362) Fall.
The History and Culture of Ancient Mesopotamia (Near Eastern Studies 363) Spring.

Introduction to Field Archaeology in Israel (Near Eastern Studies 364) Summer.
The Divided Monarchy (Near Eastern Studies 365) Fall.
The History and Archaeology of Ancient Egypt (Near Eastern Studies 367) Fall.

Yiddish Literature in Translation (Near Eastern Studies 373 and German Literature 350) Fall.
The Shtetl in Modern Yiddish Fiction in English Translation (German Literature 375 and Near Eastern Studies 375) Summer.

Topics in Yiddish Literature (German Literature 377 and Near Eastern Studies 377) Fall.

Jewish Workers in Europe and America 1798–1948 (Industrial and Labor Relations 381 and Near Eastern Studies 381) Fall.


Seminar in Syro-Palestinian Archaeology: The Israeliite Conquest of Canaan (Near Eastern Studies 461) Fall.

Latin American Studies

The Latin American Studies Program encourages and coordinates faculty and student interests in Latin America. A variety of special lectures, films, and seminars supplement the regular course offerings. Undergraduate students may arrange an independent major in Latin American studies, and graduate students may pursue a minor in Latin American studies while majoring in the graduate field of their choice. The College of Arts and Sciences offers Latin American studies courses in anthropology, economics, government, history, and sociology. In addition, there is a varied language, literature, and linguistics curriculum in Spanish, Portuguese, and Quechua. The student may also pursue Latin American studies in the College of Agriculture and Life Sciences; the College of Architecture, Art, and Planning; the College of Human Ecology; and the School of Industrial and Labor Relations.

For further information and a current course listing, students should contact the program office, 190 Uris Hall.

Law and Society

The Law and Society Program offers an interdisciplinary concentration for undergraduates who are interested in the law from the perspectives of the social sciences and the humanities: anthropology, comparative literature, economics, government, history, philosophy, psychology, science, technology, and society, and sociology. In addition, undergraduates in the College of Arts and Sciences may major in law and society through the College Scholar or Independent Major Programs. Students who wish to graduate with a concentration in law and society should consult the director of the program or one of the advisers listed above to plan a coherent program of study. Such a program should ordinarily include at least four courses from the following list. Other courses may be substituted with the approval of the adviser.

Anthropology 328 Law and Culture Not offered 1987–88

Anthropology 329 Power and Culture Not offered 1987–88

Anthropology 627 Legal Anthropology Not offered 1987–88

Comparative Literature 326 Christianity and Judaism

Comparative Literature 427 Seminar on Biblical Law Not offered 1987–88

Economics 304 Economics and the Law

Economics 354 Economics of Regulation

Government 313 The Nature, Functions, and Limits of Law

Government 322 The “Fourth” Branch

Government 327 Civil Liberties in the United States

Government 328 Constitutional Politics: The United States Supreme Court


Government 369 International Law

Government 407 Law, Science, and Public Values

Government 414 The Administrative State Not offered 1987–88
Medieval Studies
Winthrop Wetherbee, director
Undergraduates interested in medieval studies have an opportunity to take courses in the following areas of instruction: medieval Hebrew, Arabic, and Latin, Old English, Middle English, and medieval Irish and Welsh; Old Provencal and medieval French; medieval Spanish and Italian; Old Saxon, Old High German, Middle High German, Gothic, Old Norse (Old Icelandic); Old Russian; comparative literature; medieval art and architecture; medieval history; Latin paleography; medieval philosophy; musicology; comparative Slavic linguistics, comparative Romance linguistics, and comparative Germanic linguistics.
Undergraduates who want to undertake an independent major or a concentration in medieval studies should consult the director of the program, 77 Goldwin Smith Hall.
Information for prospective graduate students is contained in the Announcement of the Graduate School and in a brochure on medieval studies, which can be obtained from the director.

Freshman Writing Seminars
101 The Literary Adventure of the Middle Ages Fall or spring. 3 credits. Hours to be arranged. Staff. The legendary figures and fantastic worlds of medieval literature have entranced audiences throughout the centuries. Readings in English translation will explore works of the heroic and courtly ages, investigating such themes as the nature of the epic hero and his society (Beowulf, Icelandic sagas, the Nibelungenlied), the development of the courtly hero and lover (Arthurian romances), and the sophisticated treatment of the human comedy (Sir Gawain and the Green Knight or Chaucer's Canterbury Tales). A "medieval" work by a modern author (J. R. R. Tolkien, C. S. Lewis, or John Gardner) will also be included.

102 King Arthur and His Knights Fall, spring, or summer. 3 credits. Hours to be arranged. Staff. King Arthur and the knights of the round table inspired the best-selling literature of medieval Europe and remain a popular subject today. This course explores the Arthurian legend in medieval literature and at least one modern work (usually Mark Twain's Connecticut Yankee or a romance of T. H. White). Readings in English are chosen from the Lais de Marie de France, romances of Chrétien de Troyes, the quest for the Holy Grail (Parzival), the legend of Tristan and Isolde, Sir Gawain and the Green Knight, and Malory's Morte d'Arthur. Discussions will investigate fundamental problems raised by these stories: the individual in society, the development of the hero, the nature of love, and the dilemma of religious ideals in a secular world.

103 Fantasy and Science Fiction, Medieval and Modern Fall or spring. 3 credits. Staff. We attempt to determine what fascinates the modern imagination about the Middle Ages and whether any continuity exists between medieval and modern works. The course opens with a survey of medieval fantasy selected from varied cultures, e.g. G. Breth's Saga, The Voyage of Saint Brendan, Beowulf, Bernard Silvestris's Cosmographia, Lais of Marie de France, Arthurian romances, or Dante's Inferno. The second half of the course examines the relationship of such works to modern science fiction and fantasy with a "medieval" setting, such as J. R. R. Tolkien's The Hobbit, Italo Calvino's The Castle of Crossed Destinies, Mark Twain's Connecticut Yankee, Walter Miller's Canticle for Leibowitz, or works by Ursula Le Guin and Poul Anderson.

Graduate Seminars
601, Graduate Seminar Fall or spring. 4 credits. Topic to be announced.
602 Graduate Seminar in Bibliography and Methods (also English 710) Spring. 4 credits. M 4:15. N. Kretzmann.

Related Courses
Near Eastern Studies 233 The Lyrics of Love and Death: Medieval Hebrew Poetry in Translation (also Comparative Literature 333) Fall. 3 credits. M W F 11:15. R. Brann.
Near Eastern Studies 293 Judaism and Islam in Comparative Perspective Fall. 3 credits. W 7:30—9 p.m. R. Brann.


Courses in various aspects of medieval studies are offered each year in numerous cooperating departments, including Classics, Comparative Literature, English, History, History of Art, Modern Languages and Literatures (including German Literature, Romance Studies, and Russian Literature), Music, Near Eastern Studies, and Philosophy and by the Society for the Humanities. An up-to-date listing of the courses offered in each term will be made available at the Medieval Studies office as soon as the Course and Time Register is published.

Modern European Studies Concentration
Susan Tarrow, coordinator
Students from any college may choose an undergraduate concentration in modern European studies to complement any major in any college. The purpose of the concentration is to provide a coherent structure for students with an interest in interdisciplinary study in the field of European studies.

The concentration has two tracks:
European culture comprises courses in English and European literatures, comparative literature, semiotics, fine arts, music, architecture, film and theater arts, and women's studies.
European society comprises courses in European and comparative politics, social and political history, anthropology, sociology, philosophy, women's studies, and related courses in the School of Hotel Administration, the College of Agriculture and Life Sciences, and the School of Industrial and Labor Relations.

The requirements for completion of the concentration are
1) Completion of the European studies interdisciplinary core course
2) Three additional courses in European studies with at least one from each of the two tracks. (No more than one of these courses may be used to satisfy requirements for the student's major)
3) Competence (i.e., completion of a 300-level course or equivalent with a grade of at least B — ) in at least one modern Western European language
Students who want to take honors in the concentration must choose a senior seminar in the field and complete an honors essay. All concentrations are encouraged to spend a semester or more in a program of study in Europe and to participate in the Language House Program.

Undergraduates in the College of Arts and Sciences can major in European studies through the Independent Major or College Scholar programs.
For a list of relevant courses and seminars, departmental advisers, and any further information, contact Susan Tarrow, coordinator of the Modern European studies concentration, at the Western Societies Program, 130 Uris Hall (telephone: 255-7592).

Religious Studies

Religious studies is an interdisciplinary program reflecting a wide variety of academic interests and disciplines. The intention of the program is to provide a formal structure for the study of the religions of humankind at the undergraduate level. A student may fulfill the requirement for a concentration in religious studies by completing a minimum of four courses that have been approved by an adviser in the area of concentration.

The program is administered by a committee. The chairman is Professor Kretzmann, 320 Goldwin Smith Hall.

Courses in religious studies currently offered include the following:

Anthropology 325 Histories of Ideas of Exotica
Fall. 4 credits.
J. Boon.

Anthropology 511 Hierarchies, Ritual, and History
Spring. 4 credits.
J. Boon.

Anthropology 619 The Anthropological Study of Buddhisms in Asia
Fall. 4 credits.
T. Kirsch.

Asian Studies 349 Myth and Literature in India
Fall. 4 credits.
D. Gold with H. D. Smith, Syracuse University

Asian Studies 351 Religious Traditions of India
Fall. 4 credits.
D. Gold.

Asian Studies 460 Indian Meditation
Spring. 4 credits.
D. Gold.

Comparative Literature 326 Christianity and Judaism
Spring. 4 credits.
C. Carmichael.

Comparative Literature 328 Literature of the Old Testament
Fall. 4 credits.
C. Carmichael.

Comparative Literature 421 Old Testament Seminar
Fall. 4 credits.
C. Carmichael.

Comparative Literature 426 New Testament Seminar
Spring. 4 credits.
C. Carmichael.

English 429 Readings in the New Testament
Fall. 4 credits.
J. Bishop.

History 368 Francis of Assisi and the Franciscans
Fall. 4 credits.
B. Tierney.

Natural Resources 407 Religion, Ethics, and the Environment
Spring. 3 credits.
H. Cahen.

Near Eastern Studies 223 Introduction to the Bible
Fall. 3 credits.
G. Rensburg.

Near Eastern Studies 226 Exodus and Conquest
Spring. 3 credits.
G. Rensburg.

Near Eastern Studies 228 Genesis
Fall. 3 credits.
G. Rensburg.

Near Eastern Studies 243 History and Archaeology of Ancient Israel to 450 B.C.E.
Spring. 4 credits.
D. Owen.

Near Eastern Studies 293 Judaism and Islamic in Comparative Perspective
Fall. 3 credits.
R. Brann.

Philosophy 213 Existentialism
Fall. 4 credits.
A. Wood.

Philosophy 263 Reason and Religion
Fall. 4 credits.
N. Kretzmann.

Philosophy 215 Medieval Philosophy
Spring. 4 credits.
N. Kretzmann.

Russian and Soviet Studies Major
M. G. Clark, G. J. Staller, J. Svejnar, J. Vanek (economics); M. Rush (government); W. M. Pintner (history); W. W. Austin (music); U. Bronfenbrenner (psychology); P. Carden, C. Emerson, G. Gibian, N. Poljak, M. Scammell, S. Senderovich, G. Shapiro (Russian literature); L. H. Babby, W. Browne, R. L. Reed (Slavic linguistics)

The major in Russian and Soviet studies has the following requirements:

1) Qualification in Russian.
2) At least one course relating to Russia, at the 200 level or above, in each of the following departments: Government, Economics, History, and Russian Literature. (A course in another department may be substituted for one of the above with the consent of the major adviser.)
3) At least three additional courses, at the 300 level or above, in one of the following departments: Government, History, Economics, or Russian Literature. These courses are selected in consultation with the student's adviser and are to be approved as appropriate for a major in Russian and Soviet studies.

Professor Emerson will serve as adviser for all majors, but each student should also designate an additional adviser in the department in which his or her work is concentrated.

Courses

Economics 329 Eastern Europe Today: Economics, Government, Culture
(also Government 326 and Russian Literature 329)
G. Staller, M. Rush, G. Gibian.

Economics 367/567 Comparative Economic Systems
Fall. 4 credits.
G. Staller.

Economics 371/571 Economic Development
Fall. 4 credits.
J. Svejnar.

Economics 381 Economics of Participation and Worker Management
Fall. 4 credits.
C. Gunn.

Economics 382 The Practice and Implementation of Self-Management
J. Vanek.
Special Programs and Interdisciplinary Studies 231

Russian 107 Freshman Writing Seminar: Writers on Writing Fall or spring. 3 credits.
Staff.

Russian 121–122 Elementary Course 121, fall; 122, spring. 3 credits each term.
R. L. Leed and staff.

Russian 123 Continuing Russian Fall or summer. 4 credits.
Staff.

Russian 201–202 Readings in Russian Literature 201, fall; 202, spring. 3 credits each term.
Staff.

Russian 203–204 Intermediate Composition and Conversation 203, fall or spring; 204, spring. 3 credits each term.
L. and S. Paperno.

Russian 205–206 Russian for Scientists 205, fall; 206, spring. 2 credits each term.
S. Paperno.

L. H. Babby.

Russian 303–304 Advanced Composition and Conversation 303, fall; 304, spring. 4 credits each term.
L. and S. Paperno.

Russian 305–306 Directed Individual Study 305, fall; 306, spring. 2 credits.
Staff.

Russian 307 Themes from Russian Culture Fall. 4 credits.
Staff.

Russian 308 Themes from Russian Culture Spring. 4 credits each term. Not offered 1987–88.
Staff.

Russian 331 Russian Poetry Fall. 4 credits.
S. Senderovich.

Russian 335 Gogol Spring. 4 credits.
Staff.

Russian 367 The Russian Novel (in English translation) Fall. 4 credits.
G. Gibian.

M. Scammell.]

Russian 375 Literature of the Soviet Period 1917–45 Fall. 4 credits.
M. Scammell.

Russian 376 Literature of the Soviet Period 1945–85 Spring. 4 credits.
M. Scammell.

M. Scammell.]

P. Carden and guest lecturers.]

Russian 388 Ideas and Form in Novels of Social Inquiry (also Comparative Literature 388) Spring. 4 credits.
G. Gibian.

Russian 390 The Power of Nationalism: Expressions of National Feelings in Politics, Literature, History, and the Arts (also Comparative Literature 390) Fall. 4 credits.
G. Gibian and others.

Russian 393 Honors Essay Tutorial Fall or spring. 4 credits each term.
Staff.

[Russian 400 Reading the Great Tradition Fall. 4 credits.
Prerequisites: Russian 202 or equivalent.
Recommended: a course at the 300 or 400 level in which reading has been done in Russian. This course may be counted towards the 12 credits of Russian literature in the original language required for the Russian major. Not offered 1987–88.
T R 2:55–4:10. Staff.]

Russian 401–402 History of the Russian Language 401, fall; 402, spring. 4 credits each term.
L. H. Babby.

L. H. Babby.]

Russian 405 Russian Stylistics I Fall. 4 credits.
S. Senderovich.

[Russian 407 Russian for Teachers Fall. 4 credits.
R. L. Leed.]

Russian 413–414 Advanced Conversation and Stylistics 413, fall; 414 spring. 4 credits each term.
L. and S. Paperno.

[Russian 418 Pedagogy and the Nineteenth-Century Novel (also Comparative Literature 418) Fall. 4 credits. Not offered 1987–88.
P. Carden.]

Staff.]

S. Senderovich.]

Russian 491 Reading Course: Russian Literature in the Original Language Fall or spring. 1 credit.
Staff.

Russian 601 Old Church Slavic Fall. 4 credits.
L. H. Babby.

Russian 602 Old Russian Fall. 4 credits.
L. H. Babby.

Russian 611 Supervised Reading and Research Fall or spring. 2–4 credits.
Staff.

S. Senderovich.]

Russian 624 Russian Romanticism Fall. 4 credits.
S. Senderovich.

Russian 633–634 Russian for Graduate Specialists 633, fall; 634, spring. 4 credits each term.
L. and S. Paperno.

Russian 651–652 Comparative Slavic Linguistics 651, fall; 652, spring. 4 credits each term.
E. W. Browne.

[Russian 671 Graduate Seminar Fall. 4 credits. Not offered 1987–88.
C. G. Emerson.]

P. Carden.]

[Russian 674 Solzhenitsyn Fall. 4 credits. Not offered 1987–88.
M. Scammell.]

[Russian 675 The Russian Nabokov Spring. 4 credits. Also open to advanced undergraduates. Not offered 1987–88.
M. Scammell.]

Russian 702 Graduate Seminar: Neglected Masterpieces of Short Russian Prose Spring. 4 credits.
G. Gibian.

[Serbo-Croatian 131–132 Elementary Course 131, fall; 132, spring. 3 credits each term. Not offered 1987–88.
W. Browne.]

Serbo-Croatian 133–134 Intermediate Course 133, fall; 134, spring. 3 credits each term.
W. Browne.

Social Relations Major

W. W. Lambert, director of undergraduate studies, 238 Uris Hall, 255-6390
The major in social relations is offered jointly by the Department of Anthropology and the Department of Sociology. It provides the student with basic competence in cultural anthropology, social psychology, and sociology and gives particular emphasis to the common methods of research in these disciplines. The student is expected to obtain a grasp of the common interests and unique insights of the three disciplines, and in the senior Social Relations Seminar is expected to integrate aspects of their theory and data.

Students seeking admission to the program should have completed the following prerequisites: (a) Sociology 101 or Anthropology 201, (b) Psychology 101 or 280 or Sociology 290, and (c) Sociology 301 or Psychology 350 or an equivalent course in statistics.

The major calls for a minimum of 36 credits of course work as follows:

1) two related courses to be selected in consultation with the major adviser, in each of the three following disciplines: anthropology, social psychology, and sociology. Ordinarily these courses should be at the 300 level or above, but in special circumstances the adviser may approve one or two courses at the 200 level.

2) at least one course in methods, to be selected from the following: anthropological methods, techniques of experimentation (psychology), methods in sociology, philosophy of science or of social science, or advanced statistics.

3) at least one course in theory related to social relations

4) the senior seminar in social relations (Sociology 497 or Anthropology 495)

A list of the courses that may be used to satisfy the requirements for a major in social relations is available from any of the major advisers.

Society for the Humanities

A. D. White Center for the Humanities, 27 East Avenue.
Jonathan Culler, director; Dominick C. LaCapra, acting director

Fellows for 1987–88: Stephen R. Clingman (University of Witwatersrand), Anthony Davis (composer), Tamara Donaldson (Australian Institute of Aboriginal Studies), Michael Godfield (Cornell University), H. J. Kung (Gong Xian Rui) (Peking University), Francoise Lionnet-McCumber (Northwestern University)
University), Mark J. Mathabane (writer), Sarmia Mehez (Cornell University), Satya P Mohanty (Cornell University), Jose Piedra (Yale University), Hortense Spillers (Haverford College), Nancy Steman (Columbia University), Christopher A. Waterman (University of Washington)

Charles E. Curran, Rachel Rebecca Kaneb Visiting Professor of Catholic Studies

The Society awards annual fellowships for research in the humanities in three categories: senior fellowships, faculty fellowships, and junior postdoctoral fellowships. The Fellows offer, in line with their research, informal seminars intended to be exploratory or interdisciplinary.

These seminars are open to graduate students, suitably qualified undergraduates, and interested auditors. Students who want credit for courses should formally register in their own college. Persons other than those officially enrolled may attend as visitors with permission of the Fellow.

The Society’s theme during 1987–88 will be The Humanities and Race.

101 Science as Literature: The Profession of Science Fall 3 credits.
MWF 10:10 J. Lumley.

Philip Wylie calls science “applied honesty.” Robert Ornstein claims that “science turns the impossible into the boring.” Einstein contends that science uncovers the “grandure of reason incarnate in existence.”

Through readings ranging from Darwin to Jacob to Bronowski, we will examine these and other definitions of science and raise a series of questions: Is science a singular discipline or part of a larger human activity? Is there such a thing as “a” scientific method? Who is “the” scientist? What is the structure of the scientific community? What is its role in the larger society? Is science the enemy of religion? Of the arts? Is science basically elitist and amoral? Egalitarian and benevolent? None of the above?

102 Science as Literature: Science and the Fracturing of Self Spring 3 credits.
MWF 10:10 J. Lumley.

People’s rational perceptions of their place in nature frequently clash with their emotional need to place themselves above her. In the last 350 years, science has had the uncomfortable habit of dehumanizing human beings from their position of mastery in the universe. Through readings in Galileo, Darwin, Freud, Dyson, and others, this course will follow the human journey from a position of dominance in a geocentric, divinely ordered universe to that of a genetically programmed ordered universe.

We will flatter, criticize, or titillate. We will learn to recognize them in relation to the medium and social divisions of the culture.

411 Music and Race (also Africana Studies and Research Center 490 and Music 411) Fall 3 credits. No technical knowledge of music required. T 2:45–4:35 J. Davis.

Study of the politics of music in America, focusing on the evolution to explore other topics as well. We will examine the history/sites of Black and White musicians such as Gordiner, Cootez, and Seret to its end. Through the fiction other issues are considered: cultural politics, the construction of race and racism in Society. Basic reading in fiction, and the nature of a political aesthetic.

412 The Self and the Colonial Encounter: Kipling and Conrad (also English 440) Spring 3 credits.
Limited to 15 students.
T 2:45–4:35 S. P Mohanty.

Drawing on two writers whose work is deeply informed by their colonial encounters, this course will explore how an understanding of the “self” is dependent on the way we understand our social and political world—specifically, how notions of the self are articulated in literary works and forms and how they reflect and refract tensions and movements of an imperialist culture. Basic readings on notions of the self drawn from psychoanalysis and feminism (Freud, Chodorow, Irigaray), anthropology (Mauss, Geertz), discourse theory (Foucault, Greenblatt), and film studies (Mulvey, Heath). Literature includes Kipling’s Kim and Conrad’s Heart of Darkness and Lord Jim. Relevant historical writings by James Mill, Cecil Rhodes, Lord Macaulay, and Charles Grant.

414 Situating Métis Women Writers: Myths of Race and Origin (also Comparative Literature 414) Spring 3 credits.

An examination of the ways in which the concept of race and geographical origin are either combined or enter in conflict in the textual production of women writers who draw on many traditions while remaining unsure about the relative value of their diverse heritages. Readings from Nietzsche, Fanon, S. G. Gould, and M. Conde will question racialized thought through the writings of such authors as Maya Angelou, Marie Cardinal, M.-T. Humbert, Z. N. Hurston, and S. Schwarz-Bart.

415 The Black Within: Hispanic Race and Literature (also Romance Studies 415) Fall 3 credits.
M 2:30–4:20 J. Pedra.

The Black presence, as conquerors and conquered, pervades Spanish culture. The process of internalization of blackness has been so controversial and thorough that most Hispanic texts disguise the Black pride or prejudice they endorse. How is the “Hispanic” often understood and the formulation and transformation of power (or the valor over valued resources) in heterogeneous, rapidly expanding urban contexts. Particular attention will be paid to contemporary popular musics of sub-Saharan Africa and Latin America, for example, jujo, mbaqenga, salsa, norteno-Tejano styles, and regga.

418 Roman Catholic Social Teaching Spring.
4 credits. Limited to 17 students.

There exists within the Roman Catholic church a substantial body of official social teaching beginning with the encyclical of Pope Leo XIII, Rerum Novarum, in 1891. This course will trace its development down to the present. Special emphasis will be given to the recent pastoral letters of the United States Catholic bishops on peace and economy. Research will be examined in common including Byers, Justice in the Marketplace; National Conference of Catholic Bishops, Economic Justice for All and The Challenge of Peace: God’s Promise and Our Response; Oort, Option for the Poor: A Hundred Years of Vatican Social Teaching; Curran and McCormick, Readings in Moral Theology; and Weigel, Querelles Ordinaries: The Present Failure and Future Promise of American Catholic Thought on War and Peace.

419 Science, Race, Racism: The Response and Resistance to Scientific Racism, 1800–1930 (also Biology and Society 419) Fall 3 credits.
M 12:30–2:30; T 2:30–4:20; S. L. Gilman, N. Stepan.

An introduction to racial stereotyping in science during the nineteenth and early twentieth centuries; the intertwining of racial with other types of stereotypes (class, gender, and other divisions of the culture), and how these stereotypes structure the language of science; a study of the responses of stereotyped groups (e.g., Jews, Blacks, women, gays) through a reading of their writings in which stereotyping is addressed either directly or indirectly, and an attempt to formulate some general conclusions about the varieties of these responses. This course satisfies the senior seminar requirement for the concentration in Western European studies.

420 The Political Economy of Race Spring.
3 credits.

In what different ways has “race” shaped the course of modern history? How have questions of national culture and the formation of national identities influenced the political movements and conflicts of our age? The course will consider such issues by focusing, in various international contexts, on such topics as the following: colonialism, uneven development, the international division of labor, state-determination, and cultural politics. Readings will be drawn from a variety of fields and disciplines, and there will be presentations by guest scholars on their current research on these and related issues.

421 Race and American Exceptionalism Fall 3 credits.
Prerequisite: permission of instructor. Limited to 17 students.
T 12:30–2:20; M. Goldfield.

United States political culture is different from that of other developed capitalist countries. Here one finds no significant labor, socialist, or communist party—no large political organization claiming primarily to represent the interest of its working class constituents. This unique feature of United States political life is generally referred to as “American exceptionalism.”
Among the supposed explanations for American exceptionalism that this seminar will examine are the lack of a feudal past, the existence of free land in the West, early white male suffrage, a federal system of government, and a greater and more rapid rate of ethnic integration and, wide ethnic diversity. We will then proceed to examine the proposition that the historic existence of racism in the United States is more a fundamental reason for the unique features of United States political culture than any of the other proffered explanations.

422 From Soweto to Harlem: Writing about the Black Experience in South Africa and America (also African Studies and Research Center 422) Spring, 3 credits
M T 12:30–2:20. M. Mathabane
A comparative study of the Black experience in South Africa and America through the critical analysis of literature that has sought to depict Blacks in the two societies in their struggle for an identity other than the one foisted on them by racism and oppression.

Many North African writers are the product of the attempt to create "des nouvelles Frances" in the "Maghreb." The resistance to colonialism is the outcome of the unique intersection between the French language and the Arabo-Berber culture. This course will explore how North African writers articulate their experience of racism and cultural repression in their national and cultural identities. We will analyze the different levels at which Francophone North African texts present a kind of resistance to, and contestation of, French literary and linguistic hegemony. Attention will be given to the context and changing relationship that exists between the author, his language, and the actual text he produces, in an attempt to reconsider the colonizer-colonized dichotomy. Most readings will be in French.

This course will explore the links and disjunctures between autobiographical, historical, and fictional narratives, with a view toward interrogating the "tyranny of history" and the possibility of privileging the narratives of "history" in a cultural situation that arises in violence? Most of the texts are centered in Afro-American culture: Douglass's Narrative, DuBois's Souls of Black Folk, Malcolm X's Autobiography, Angelou's I Know Why the Caged Bird Sings, Wright's Black Boy, Widener's Brothers and Keepers, Rodríguez's Hunger of Memory, Baldwin's Notes of a Native Son and The Fire Next Time, Ellison's Invisible Man, Murray's Train-Whistled Guitar and or/Ornament, Morrison's Song of Solomon, Marshall's Chosen Place, Timeless People, and Bradley's Natchez Incident.

426 Studying a Colonized Culture (also Linguistics 700) Spring. 3 credits.
M T 2:30–4:20. T. Donaldson
An examination of the respect of the semantics of languages spoken by Australian aborigines and the aboriginal cultures, especially song traditions. There will be a focus on the history of aborigines and their mutual perceptions and an attempt to identify the effects of this history, both on aboriginal practice and on outside reactions to it. We will look in particular at the gathering and presentation of aboriginal information in pursuit of academic interests valued by the dominant society. No previous knowledge of aboriginal languages or cultures is required.

427 Fundamental Moral Theology Fall. 4 credits. Limited to 17 students.
In the Roman Catholic tradition that branch of philosophy known as moral theology is devoted to the systematic, schematic, and reflexive study of the Christian moral life. This course will undertake a comprehensive exposition of moral theology with the aim of developing the following aspects of the discipline: the basic stance of moral theology, the ethical model, the person as subject and agent of moral action, and Christian decision making and its relation to action. Readings include Haring, Free and Faithful in Christ: Moral Theology for Clergy and the Laity, vol. 1; Niebuhr, Christ and Culture; Stout, Protestant and Roman Catholic Ethics: Prospects for Rapprochement; O'Connell, Principles for a Catholic Morality; and Curran, Directions in Fundamental Moral Theology.

South Asia Program
The South Asia Program coordinates research, teaching, and special campus events relating to Bangladesh, India, Pakistan, Nepal, and Sri Lanka. The program faculty includes members from a variety of disciplines, including agricultural economics, agricultural engineering, anthropometry, architecture, art, city and regional planning, communication, comparative literature, education, English, government, history of art, human ecology, international agriculture, linguistics, planning and rural sociology, and science, technology, and society. Undergraduates with a special interest in the region may major in Asian studies with a South Asian concentration. The languages regularly offered are Bengali, Hindi, Nepali, Sinhala, Tamil, Telugu, Urdu, Sanskrit, and Tamil. Cornell is a class A member of the American Institute of Indian Studies (AIIS), and undergraduates as well as graduate students are eligible for AIIS intensive language program fellowships in India. For courses available in South Asian studies and details on the major, see the Department of Asian Studies listing in this volume. Students who want further information on courses and research opportunities should direct questions to the program office, 170 Uris Hall.

Southeast Asia Program
Southeast Asia studies at Cornell is included within the framework of the Department of Asian Studies. Fourteen full-time faculty members in the Colleges of Arts and Sciences, and Agriculture and Life Sciences participate in an interdisciplinary program of teaching and research on the history, culture, and societies of the region stretching from Burma through the Philippines. Courses are offered in such fields as agricultural economics, international relations, anthropology, government, history, history of art, linguistics, music, and rural sociology.

Women's Studies Program
Women's Studies, a university program in the College of Arts and Sciences, has three goals: to encourage the development of teaching about women and sex roles for women and men; to examine assumptions about women in various disciplines and to develop, systematize, and integrate back into the disciplines new knowledge about women; and to cooperate in public service activities with the extension divisions of the university. The program is guided by a board composed of faculty, staff, and students at Cornell and members of the Ithaca community who have an intellectual interest in women's studies. Program facilities in Uris Hall, including reading room, informal lounge, and seminar room, are open to all interested students and faculty.

Program Offerings
Undergraduate students in the College of Arts and Sciences who want to major in women's studies can develop their own major through the College Scholar or Independent Major program. Any undergraduate student in the university may elect a women's studies minor. Students interested in either the major or the minor should obtain further information from the Women's Studies Office, 332 Uris Hall.

The program typically sponsors a noncredit seminar/ study group for graduate students and faculty to facilitate sharing of knowledge across disciplinary lines. During the academic year the program also sponsors frequent public lectures dealing with social, political, and intellectual issues in women's studies.

The Concentration
Undergraduate students who wish to graduate with a concentration in women's studies should consult with the director of undergraduate studies in women's studies to select an adviser. In collaboration with that adviser, students will design a coherent program in women's studies to complement their major. Before graduation students will submit to their adviser a final summary on their completed work in women's studies. The concentration is open to students in all colleges of the university.

The concentration in women's studies consists of four courses. Typically, two courses are selected from the list of general courses and two from the list of specialized courses (see below). Freshman writing seminar, related courses, or independent study in women's studies may be substituted for specialized courses in the concentration with the prior approval of the adviser. For further information or to meet with the director of undergraduate studies to select an adviser, students should contact the Women's Studies Office, 332 Uris Hall, 255-6840.

Distribution Requirement
Distribution requirements are satisfied by any two women's studies courses in any of the following categories:

- Anthropology and sociology
- Comparative literature
- Ethnic studies
- History
- Political science
- Psychology
- Women's studies

Among the supposed explanations for American exceptionalism that this seminar will examine are the lack of a feudal past, the existence of free land in the West, early white male suffrage, a federal system of government, and a greater and more rapid rate of ethnic integration and, wide ethnic diversity. We will then proceed to examine the proposition that the historic existence of racism in the United States is more a fundamental reason for the unique features of United States political culture than any of the other proffered explanations.
I. Freshman Seminars

105 Feminine and Masculine Ideals in Japanese Cultural Studies (Studies 105) Spring. 3 credits.
M W F 10:10. Staff.
In its long history, Japanese culture has developed a large number of role models—the aristocrat, poet, priest, warrior, entertainer, "salary man," and "education mama"—and idealized them in its literature and art. Using these ideals as its subject matter, the seminar will give students practice in reading texts closely, analyzing ideas, and writing various types of papers. Through studying Japanese concepts of femininity and masculinity, the students will not only explore a new culture but also will gain new perspectives on their own cultures.

106 Women and Writing (also English 105) Fall and spring. 3 credits.
Hours to be arranged. Staff.
What is a woman? How does she confront her personal experience? Does she play a special role in history, in our definition of society, or in our understanding of language and literature? This course will explore the relation between women and writing. We will discuss writings by and about women, debate our attitudes toward feminism, and analyze the reasons for these questions to our own written work. Individual sections will emphasize different aspects of the relation between women and writing. Which section to choose should depend on your own interest in exploring how women appear in private or autobiographical writings, historical contexts, and/or literary works. Further information on specific sections is available in the freshman writing seminar office. Textual overlap among the sections is kept to a minimum so that students can take more than one Women and Writing seminar during their time at Cornell.

II. General Courses

110 Introduction to Women's Studies Fall. 3 credits. Limited to 25 students.
This course introduces students to critical approaches in feminist scholarship to the cultural, socioeconomic, and political issues of women. Particular attention will be paid to the conceptual challenges and dangers posed by attempts to study "women" without taking account of relations between race, class, and gender in ideological and cultural formations. Readings will draw on work in various disciplines and will include literary texts and visual images.

214 Biological Basis of Sex Differences (also Biological Sciences 214) 3 credits. Prerequisite: one year of introductory biology. Not offered 1987–88.
The structural and functional differences between the sexes are examined. Emphasis is placed on mechanisms of mammalian reproduction, and where possible, special attention is given to studies of human sex differences. Current evidence on the effects of gender on nonreproductive aspects of life (behavior, mental and physical capabilities) is discussed. The course is intended to provide students with a basic knowledge of reproductive endocrinology and with a basis for objective evaluation of sex differences in relation to contemporary life.

218 Women's Work and Labor Markets (also City and Regional Planning 218) Spring. 3 credits.
Hours to be arranged. L. Bender.
The emphasis in this course will be on the economic aspects of work and women: What are the consequences of women's concentration in reproductive roles and how does domestic work play in the larger economy? What are the consequences of occupational segregation by gender? Why is the wage gap between men and women disappearing? What is the role of discrimination? What is the role of discrimination? What is the role of discrimination? What is the role of discrimination? What is the role of discrimination?

227 Modern American Sex Roles in Historical Perspective (also History 227) 4 credits. Each section limited to 20 students. Intended primarily for sophomores. Not offered 1987–88.
Hours to be arranged. M. B. Norton.
A reading and discussion course. The class will begin by examining sex roles in the United States in the 1980s, looking at a variety of sources like popular magazines and contemporary commentaries. We will then move backwards in time in an attempt to uncover the roots of contemporary sex roles. The students will help to determine which topics the class will investigate in detail.

244 Language and the Sexes (also Linguistics 244) Spring. 4 credits. Not offered 1987–88.
S. McConnell-Ginet.

[277 Psychology of Sex Roles (also Psychology 277 and Sociology 277) 3 or 4 credits. Limited to 200 students. Prerequisite: an introductory psychology course. Not offered 1987–88.]
S. Bern.

Addresses the question of why and how adult women and men come to differ in their overall life-styles, work and family roles, personality patterns, cognitive abilities, etc. This broad question is examined from five perspectives: (a) the psychoanalytic perspective; (b) the biological perspective; (c) the historical and cultural evolutionary perspective; (d) the child development perspective; and (e) the social-structural and contemporaneous perspective. Each of these perspectives is also brought to bear on more specialized phenomena relating to the psychology of sex roles, including psychological androgyny, women's conflict over achievement, the male sex role, egalitarian marriage relationships, gender-liberated childrearing, female sexuality, homosexuality, and transsexuality.

321 Sex and Gender in Cross-Cultural Perspective (also Anthropology 321) Spring. 4 credits.
M W F 2:30. K. S. March.
An introduction to the study of sex roles cross-culturally and to anthropological theories of sex and gender. The course examines various aspects of the place of the sexes in social, political, economic, ideologically, and psychologically different systems and contexts. Emphasis is given to the historical evolution of gender and sex role definition around the world.

[326 Women in American Society, Past and Present (also History 326) 4 credits. Not offered 1987–88.]
M. B. Norton.
A survey of women's experiences in America from the seventeenth century to the present. Among the topics to be discussed are women's familial roles, the changing nature of household work, the women's rights movement, employment of women outside the home, and contemporary feminism.

353 Feminism: State and Public Policy (also Government 353) Fall. 4 credits.
M W F 9:05. M. Katenzen.
The course examines aims and strategies of the feminist movement in the United States and the response of both society and the state to feminist claims. It is thus a course about political protest and the capacity of American political institutions to promote and support, as well as to confront and change. In examining the law and public policy on such issues as job discrimination, wife battery, rape, abortion, etc., the course explores the contradictions between, and the congruence of, the dual ideals of individual choice and group equality.

C. A. Martin.
This course is designed to explore developments in contemporary feminist theory with particular attention to feminist critiques, reinterpretations, and uses of Marxist, psychoanalytic, and (post)structuralist thought. We will be concerned with the ways in which radical feminist questions converge with developments in these fields and the ways in which feminist analyses challenge some of the most basic assumptions embodied in these and other social theories. We will consider the approaches of a variety of feminist thinkers to the relations between a gender, race, class, and sexual divisions.

III. Specialized Courses and Seminars

208 Gender, Race, and Medical "Science" (also Africana Studies 208) Fall. 3 credits.
The course will examine the social construction of race and gender in the natural and medical sciences from the turn of the century to the present. Beginning with readings that propose a new view of scientific medicine as a system of signs and symbols and as culturally embedded, we
will proceed to an examination of some of the following topics: racism and experimentation; the treatment of venereal disease and tuberculosis; the demise of social childbirth; the body as a medical product; menstruation as pathology; the mythologized mind: women and psychiatry; the political economy of health care; medical authority; the training of medical students; political anatomy of the body; sites of resistance; and alternative systems: cross-cultural case studies.

238 The Historical Development of Women as Professionals (formerly 348 and 480) (also Human Development and Family Studies 258) Fall. 3 credits. Students in endowed units must register for Women's Studies 238. T R 10:10–11:25. J. Brumburg. The historical development of women's roles in the professions in America (midwifery, nursing, teaching, librarianship, home economics, and social work) as well as women's struggles to gain access to medicine, law, the clergy, and the academy will be explored. Reading, discussions, and film are geared to identifying the cultural patterns that fostered the perception of gender-specific work and the particular historical circumstances that created these different work opportunities. The evolution of professionalism and the consequences of professionalism for women, family structure, and American society are also discussed.

248 Major Nineteenth-Century Novelists (also English 247) 4 credits. Not offered 1987–88. J. Blackall. This course gives particular attention to the biographical and social circumstances surrounding the novels, their critical reception within their own time, and the themes and subject matter that women novelists elected to write about. The reading includes masterworks and certain other works that exerted a major imaginative impact on contemporary readers. Readings are Austen, Persuasion; C. Bronte, Jane Eyre; E. Bronte, Wuthering Heights; Gaskell, Mary; Barton, Stephen; Uncle Tom's Cabin: Eliot, The Mill on the Floss; Gilbert, The Yellow Wallpaper; Chopin, The Awakening. In addition, two twentieth-century works, Jean Rhys's Wide Sargasso Sea and Edith Wharton's Ethan Frome, will be approached as imaginative sequels to Jane Eyre and Wuthering Heights respectively.

251 Twentieth-Century Women Novelists (also English 251) 4 credits. Not offered 1987–88. M. Hite. This course will be particularly concerned with self-consciousness as expressed, in part, with some of the questions about women's experience, perspective, and language raised by recent feminist criticism. We will read works by Virginia Woolf, Jean Rhys, Djuna Barnes, Doris Lessing, Toni Morrison, Margaret Atwood, Alice Walker, and others.

297 Beyond the Stereotype: Images of Women in the Middle East (also Near Eastern Studies 297) 3 credits. Not offered 1987–88. S. Mehrez. We will be reading nonfictional works on women, as well as works of fiction written by women, in an attempt to re-evaluate certain stereotypes and functions ascribed to Middle Eastern women throughout history. Our starting point will be the Koran, the text that continues to regulate the formation of the image of women. We will investigate the degree of acceptance or rejection of such an imposed image as it manifests itself in contemporary texts.

348 The Female Literary Tradition: Wollstonecraft to Woolf (also English 348) Spring. 4 credits. M. W. F 12:20. M. Jacobus. A survey of the (mainly female) female literary tradition from the French Revolution to early twentieth-century modernism. The course will trace the dual legacies of romanticism and revolution through their monstrous and gothic forms, exploring their repressed presence in Victorian women's fiction until they surface again in the writing of the 1848 revolution and after. As well as the social protest literature of the mid-nineteenth century, we will look at the literature of the (female) uncanny, through which Victorian women writers confront their inner worlds, before turning to the emergence of the "new woman" and Utopian women's fiction at the end of the nineteenth century and to the beginnings of the twentieth-century modernist experiment by women. Texts will include works by Wollstonecraft, Austen, Mary Shelley, Emily and Charlotte Bronte, Eliot, Barrett Browning, Gaskell, Gilman, Schreiner, and Woolf.

349 Women in Medieval Literature (also German 348 and Comparative Literature 349) Spring. 4 credits. M. W. F 9:05. B. Buettner. A study of women and their roles in the social order as portrayed in the literature of the Middle Ages. Readings will illustrate the range of attitudes toward women from asceticism and antifeminism to their idealization in courtly love lyric and romance. We will examine works by Wolfram von Eschenbach, Wolfram von Eschenbach, Wilhelm, selected Mariological and mystical poems, courtly love lyric, Parnass, and Tristan and Isolde.

363 Women in Classical Greece and Rome (also Classics 363) Spring. 4 credits. M. W. 2:30–3:45. L. S. Abel, J. Ginsburg. In this course we will examine the evidence about the social and political position of women in ancient Greece and Rome and consider the images of women in Classical literature. The purpose will be to trace the origins of some Western attitudes about women and to address general historical questions about evidence and problems in using literature and historical writing to assess social roles.

366 Feminism, Sexuality, and the Politics of Identity (also Government 366) Spring. 4 credits. Prerequisite: permission of instructor. Hours to be arranged. C. A. Martin. The purpose of this course is (1) to explore the theoretical and political significance of women's experiences of sexuality and sexual identity; (2) to examine attempts to define the construct "lesbianism"; (3) to consider the limitations of "identity politics"; and (4) to analyze the implications of class, race, and ethnicity for "sexual politics.

390 The Fiction of Modern Hispanic Women (also Spanish 390) Fall. Taught in Spanish. T R 11:40–12:55. D. Castillo. This course will survey a representative sampler of novels and short stories by twentieth-century Hispanic women. We will be giving particular attention to typical themes and subject matter relating to women's experience and perspectives in the context of questions raised by feminist criticism. Readings will be supplemented by works by Silvia Ocampo, Rosario Ferre, Susana Torres Molina, Carmen Martin Gaito, Carmen Gomez Ola, Luisa Valenzuela, Cristina Peri Rossi, Mercedes Salisachs, and Albaida Angel.

402 Black Women and Their Fictions (also English 401, Comparative Literature 401) Spring. 4 credits. T R 10:10–11:25. H. Gates. This course intends to define the precise shape and contours of the tradition of Black women's writing in English. How do Black women use language to represent their experiences? How do their writings resemble or diverge from the Black male tradition? How does Black feminist theory differ from white feminist theory? These are the concerns of this class. Readings are by Harriet E. Wilson, Frances Harper, Anna Julia Cooper, Nelly Larsen, Zora Neale Hurston, Gwendolyn Brooks, Ann Petry, Paula Marshall, Toni Morrison, Toni Cade Bambara, Gayle Jones, Alice Walker, Gloria Naylor, and Jamaica Kincaid.

404 Women Artists (also History of Art 404) Fall. 4 credits. Prerequisite: permission of instructor. T 2:30–4:30. J. Bernstock. This seminar will be devoted to a study of the work of women artists from antiquity to the present. The work of the most important women artists from each period will be studied in relation to the changing roles of women in society and to the art produced contemporaneously by men.

406 The Culture of Lives (also Anthropology 406) 4 credits. Not offered 1987–88. K. March. This seminar explores the insights provided by biographical-autobiographical accounts into both the particularities of individual lives and into the wider social and cultural forms of those lives. We will look at the place of life histories within development of anthropology as a discipline from the earliest explorers' accounts, through the florescence of their importance in early American ethnographic description, and into the contemporary resurgence of interest in personal narratives as windows onto both the social or cultural construction of the person and the personal construction of the social or cultural. Course materials drawn directly upon women's narratives, as well as representations, both to contrast women's and men's accounts and to underscore the special significance of women's narratives in anthropology.

408 Gender Symbolism (also Anthropology 408) 4 credits. Not offered 1987–88. K. March. Through this seminar we look at how cultural meaning is constructed about biological sex differences. We begin from the presumption that sex difference and gender are culturally defined as a system of categories and meanings interacts with people's cognitive, intellectual, and affective experience of their worlds. The seminar has two primary conceptual objectives: (1) to analyze the relations among gender symbols and (2) to explore the relations between these symbols and the social worlds of the people who believe in them.

414 Situating Métis Women Writers: Myths of Race and Origin (also Society for Humanities 414 and the Comparative Literature 414) Spring. 3 credits. R 12:30. F. Lonnert-McCumber. An examination of the ways in which the concept of race and geographical origin are either combined with, or operate in conflict with, the production of women writers who draw on many traditions while remaining unsure about the relative value of their diverse heritages. Readings from Nietzsche, Fanon, S. Said, and M. Conley will be utilized. The course will focus on the writings of such authors as Maria Angelou, Arie Cardinal, M.-T. Humbert, Z. N. Hurston, and S. Schwarz-Bart.

415 Feminism, Psychoanalysis, and Sexual Difference (also Society for the Humanities 415) 3 credits. Not offered 1987–88. M. Jacobus. How does psychoanalysis produce its definitions of sexual difference? How does "woman" (as a figure for sexual difference) sustain psychoanalytic theory itself? The course will examine the ideological bases and intellectual methods of psychoanalysis from the point of view of feminist inquiry. Starting with Freud's founding texts on femininity and debate with the early feminist psychoanalysts, we will explore the ways in which feminist theory has engaged with psychoanalysis over the question of sexual difference. The course will include Lacan's rereadings of Freud and discussion of his theories of feminine sexuality in the light of work by Lacanians and post-Lacanians. Readings in England, France, and the United States.

425 Gender Relations and Social Transformation (also Sociological Sociology 425) Fall. 4 credits. Students in the endowed colleges must register for Women's Studies 425.

domestic-household, agricultural, and industrial work as productive processes change internationally. The course emphasizes the configuration of various economic and social sectors and their realignments within countries in response to technology transfer, the transformation of the labor market, and changing family forms.


428 Witchcraft Possession, Shamanism, Curing, and Witchcraft (also Anthropology 428) Spring. 4 credits. Limited to 20 students. Prerequisite: background in anthropology or women's studies. T 8:40–10:40. D. Holmberg. An anthropological consideration of witchcraft, shamanisms, and cults of spirit possession, with special attention to the play of gender. Classic anthropological accounts of non-Western societies will be considered along with ethnographic and historical accounts of Western societies. The course also addresses general problems in the study of women and gender and the anthropology of myth, ritual, and symbolism.


J. Blackall. A close focus on five masterworks of the nineteenth century—Austen's Pride and Prejudice and Emma; Gaskell's Life of Charlotte Brontë and Wives and Daughters; and Eliot's Middlemarch—with particular regard for the circumstances, biographical and social, from which these works emerged. We will examine these writers’ perceptions of the institution of marriage; their delineation of the problem of attaining self fulfillment and self-expression within a domestic and rural community, especially for women; and their concepts of a "heroine" and a "hero." Emphasis will be on reading and discussion. Participants will keep journals reflecting their personal responses to the books and their pursuit of chosen topics; these notes leading to one final essay of moderate length.

[450 Seminar in the Psychology of Gender (also Psychology 450) 4 credits. Limited to 15 junior and senior psychology majors. Prerequisite: Psychology 201 and permission of instructor. Not offered 1987–88.]

S. Bern. This seminar is designed primarily for advanced students in psychology who have a strong interest in research. Each term the course is offered, a particular research topic will be selected by the instructor for consideration in depth. The topic will be announced at the first meeting of the course. All interested students should attend that meeting.

[455 Victorian and Modernists: Literary Legends from Wilde to Woolf (also English 455) 4 credits. Not offered 1987–88.]

S. Siegel.]


460 Gender in Nineteenth-Century America (also English 451/661) Fall. 4 credits. T R 2:55–4:10. S. Samuels. A study of the relation between historical experience and literary texts. We will examine from the perspectives of both historical and literary analysis the rise of women writers, the novel's preoccupation with conflicts between men and women, the cultural uses of feminism and antifeminism, and the impact of the new women's movement. Bringing together traditional literary texts—novels and poetry—into dialogue with "nonliterary" writings like journalism, political treatises, social reform manifestos, and etiquette books, we will draw on the methods and theories of cultural studies to ask how gender relations and the history of women bear on the plots, discourses, and images of literary texts. A tentative reading list would include Susannah Rowson's Charlotte Temple, Lydia Maria Child's The Mother's Book, Catherine Beecher's A Treatise on Domesticity, Nathaniel Hawthorne's The Blithedale Romance, works by Angelica and Sarah Grimke, Harriet Beecher Stowe's Uncle Tom's Cabin, poems by Emily Dickinson and Walt Whitman, Louisa May Alcott's Little Women, Edith Wharton's House of Mirth, William Dean Howells' A Hazard of New Fortunes, and Charlotte Perkins Gilman's Herland.

[476 Women's Poetry (also English 476) Spring. 4 credits. Limited to 25 students. Prerequisite: permission of instructor. Not offered 1987–88.]

D. Meme. A historical survey of the female poetic tradition in Britain and America, including such writers as Bronte, Dickinson, Bronte, Barrett Browning, Bishop, Brooks, and Fitch.

[493 French Feminisms (also French 493) 4 credits. Not offered 1987–88.]

N. Furrer. This course will examine the political, philosophical, and literary concerns in contemporary French feminist writers. Readings will include representative texts by Simone de Beauvoir, Marguerite Duras, Luce Irigaray, Monique Wittig, and Helene Cixous. Taught in English.

499 Directed Study Fall or spring. Variable credit. Prerequisite: one course in women's studies and permission of a faculty member of the Women’s Studies Program Board. Hours to be arranged. Staff.

513 The Political Economy of Women and Work I (also City and Regional Planning 513) Fall. W 7–10 p.m. L. Beneria. This course deals with the question of how to understand and analyze the economic condition of women, starting with some general issues about the "question of origins," reproduction and production, and the underestimation of women's economic activities. It then deals with different approaches to the analysis of women's work in the household and in the labor market (from an economic and feminist perspective). The empirical work will concentrate mostly on the United States with some glances at other industrial countries and the international economy.

514 The Political Economy of Women and Work II (also City and Regional Planning 514) Spring. 4 credits. W 7–10 p.m. L. Beneria. A continuation of Women’s Studies 513.

[626 Graduate Seminar in the History of American Women (also History 626) 4 credits. Limited to graduate students. Not offered 1987–88.]

M. B. Norton. A reading and research seminar intended for graduate students. Major works in American women's history will be carefully scrutinized, and each student will prepare a lengthy research paper.

[638 Contemporary German Women Writers (also German Literature 638) Fall. 4 credits. Not offered 1987–88.]

I. Ezergailis.]

[660 Black Women and Their Fictions (also Women's Studies 402 and English 401) Fall. 4 credits. H. Gates. This course intends to define the precise shape and contours of the tradition of black women's writing in English. How do black women use language to represent their experiences? How do their writing resemble or diverge from the black male tradition? How does black feminism differ from white feminism? These are the concerns of this class. Readings are by Harriet E. Wilson, Frances Harper, Anna Julia Cooper, Nelly Larsen, Zora Neale Hurston, Gwendolyn Brooks, Arna Bontemps, Patricia Hill Collins, Toni Morrison, Toni Cade Bambara, Gayle Jones, Alice Walker, Gloria Naylor, and Jamaica Kincaid.

[685 Seminar in Sex Differences and Sex Roles (also Psychology 685 and Sociology 685) 4 credits. Prerequisite: permission of instructor. Not offered 1987–88.]

S. Bern.]

[690 German Feminist Criticism and Theory (also German Literature 690) 4 credits. Open to qualified undergraduates with permission of instructor. Reading knowledge of German recommended but not required. Not offered 1987–88.]

C. A. Martin. This course is designed to explore developments in feminist literary theory that have offered an alternative to the field of German literature. We will consider competing critical strategies and their political implications by working through different readings of specific literary texts and by raising question about the implications for feminism of competing critical strategies in the general field of literary theory; the relations between feminism and established critical schools; the tension in feminist Gerander between critical attention to the "male canon" and the construction of a female literary tradition; the impact on West and East German feminism(s) of their translations of French and American works; the impact and treatment of the Nazi period; the effects of the East-West divide on development in both Germany; the impact on feminist literature and criticism of Third World women in Germany; and approaches in West and East Germany to imperialism and racism.

778 Women in International Development: Domestic and Foreign Issues (also City and Regional Planning 778 and Rural Sociology 497) Spring. 1 credit. Hours to be arranged. L. Beneria.

This lecture series will deal with different topics dealing with women in the context of international development. It will focus on industrialized as well as less-industrialized countries—with the purpose of exploring commonalities and differences amongst each group of countries, the links between domestic and global issues. The lectures will be given by invited speakers known for their work on these topics. Readings recommended by each speaker will be available for each lecture. Students will be asked to write an evaluation at the end of the course.
Contemporary Family Theory and Research (Human Development and Family Studies 650)

Women at Work (Industrial and Labor Relations 366)

Administration

Geoffrey V. Chester, dean
Isaac Kramnick, associate dean
Lynne S. Abel, associate dean

Jane V. Pedersen, director of finance and administration
Rosemary Silbey, director of development

Bonnie Buettner, assistant dean for seniors and career programs and prelaw adviser
Beatrice G. Rosenberg, assistant dean for sophomore programs and prelaw adviser

Faculty Roster

Abdali, Mitchell Y, Ph.D., SUNY at Stony Brook. Asst. Prof., Organizational Behavior/Sociology
Abrams, Meyer H, Ph.D., Harvard U. Class of 1916 Professor of English Emeritus, English
Abruña, Hector D, Ph.D., U. of North Carolina at Chapel Hill. Asst. Prof., Chemistry
Adams, Anne, Ph.D., U. of Michigan. Asst. Prof., Women's Studies and Research Center
Adams, Barry B, Ph.D. U. of North Carolina. Prof., English

Ahl, Frederick M, Ph.D., U. of Texas at Austin. Asst. Prof., Classics
Allbrecht, Andreas C, Ph.D., U. of Washington. Prof., Chemistry
Aldmendinger, Richard W, Ph.D., Stanford U. Asst. Prof., Geosciences
Ambegaokar, Vinay, Ph.D., Carnegie Inst. of Technology. Asst. Prof., Physics/LSAP
Ammon, Arche R, B.S., Wake Forest Coll. Goldwin Smith Professor of Poetry. English
Anderson, Benedict R, Ph.D., Cornell U. Prof., Government
Archer, Richard J., M.A., U. of Missouri at Kansas City. Asst. Prof., Theatre Arts
Arroyo, Cinacio M., Ph.D., U. of Munich (Germany). Emerson Hinchi Professor of Spanish Literature, Romance Studies/Comparative Literature
Asher, Robert, Ph.D., U. of California at Los Angeles. Prof., Anthropology
Austin, William W, Ph.D., Harvard U. Given Foundation Professor of Musicology, Music

Babaoğlu, Ozalp, Ph.D., U. of California at Berkeley. Asst. Prof., Computer Science
Babb, Leonard H, Ph.D., Harvard U. Prof., Modern Languages and Linguistics/Neart Eastern Studies
Bacharak, Samuel B, Ph.D., U. of Wisconsin. Assoc. Prof., Industrial and Labor Relations/Sociology
Barad, Barbara, Ph.D., Cornell U. Assoc. Prof., Chemistry

Barazangi, Muawia, Ph.D., Columbia U. Prof., Geosciences
Bassett, William A, Ph.D., Columbia U. Prof., Geosciences
Bathrick, David, Ph.D., U. of Chicago. Prof., German Literature and Theatre Arts

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Beckwith, Steven V, W, Ph.D., California Inst. of Technology. Assoc. Prof., Astronomy/CRSRT
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Berkeltam, Karl, Ph.D., Cornell U. Prof., Physics/LSAP

Birnbaum, Judith, Ph.D., Cornell U. Prof., History
Berstein, Israel, Candidate in Physico-Mathematical Sciences, Roumanian Academy. Prof., Mathematics
Bethe, Hans, Ph.D., U. of Munich (Germany). John Wendell Anderson Professor of Physics Emeritus, Physics

Bielli, Laura J., Ph.D., City U. of New York. Prof., Mathematics/Operations Research and Industrial Engineering
Bird, John M, Ph.D., Rensselaer Polytechnic Inst. Prof., Geosciences

Birman, Kenneth P, Ph.D., U. of California. Asst. Prof., Computer Science
Bishop, Jonathan P, Ph.D., Harvard U. Prof., English
Bittman, Dina, Ph.D., U. of Wisconsin at Madison. Prof., Computer Science
Blackall, Eric A, Litt., Cambridge U. (England). Jacob Gould Schurman Professor of German Literature Emeritus, German
Blackall, Jean F, Ph.D., Harvard U. Prof., English
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Blume, Stuart M, Ph.D., U. of Pennsylvania. Prof., History
Bogel, Fredric V, Ph.D., Yale U. Prof., English
Boon, James A., Ph.D., U. of Chicago. Prof., Anthropology/Comparative Literature
Bowes, John S, Ph.D., Massachusetts Inst. of Technology Prof., Modern Languages and Linguistics

Boyd, Richard R, Ph.D., Massachussetts Inst. of Technology Prof., Philosophy
Bramble, James H., Ph.D., U. of Maryland. Prof., Mathematics
Brann, Ross, Ph.D., New York U. Asst. Prof., Hebrew and Arabic Literatures (Near Eastern Studies)
Brazel, Karen W, Ph.D., Columbia U. Prof., Japanese Literature (Asian Studies)
Breier, Ronald L, Ph.D., Harvard U. Prof., Sociology
Briggs, Herbert W, Ph.D., Johns Hopkins U. Goldman Smith Professor of International Law Emeritus, Government

Bronfenbrenner, Urie, Ph.D., U. of Michigan. Jacob Gould Schurman Professor, Human Ecology/ Psychology
Brown, Kenneth S, Ph.D., Massachussetts Inst. of Technology Prof., Mathematics
Brown, Larry D, Ph.D., Cornell U. Assoc. Prof., Geosciences
Brown, Lawrence S, Ph.D., Cornell U. Prof., Mathematics
Brown, Stuart M, Jr., Ph.D., Cornell U. Prof. Emeritus, Philosophy/Science, Technology, and Society
Brown, Theodore M, Ph.D., U. of Utrecht (Netherlands). Prof., History of Art
Browne, Eweson W, Ph.D., U. of Zagreb (Yugoslavia). Assoc. Prof., Modern Languages and Linguistics
Brumbaugh, Joan Jacobs, Ph.D., U. of Virginia. Assoc. Prof., Human Development and Family Studies/ Women's Studies

Buck-Morris, Susan F, Ph.D., Georgetown U. Assoc. Prof., Government
Burdeitt, Kenneth, Ph.D., Northwestern U. Assoc. Prof., Economics
Burdick, James M., Ph.D., Massachusetts Inst. of Technology Assoc. Prof., Chemistry
Caldwell, Steven B., Ph.D., Cornell U. Assoc. Prof., Sociology
Calkins, Robert G., Ph.D., Harvard U. Prof., History of Art
Campbell, Donald B., Ph.D., Cornell U. Adjunct Prof., Astronomy/NAIC
Caplan, Anthony F., Ph.D., Cornell U. Prof., English/Comparative Literature
Carden, Patricia J., Ph.D., Columbia U. Prof., Russian Literature
Carlson, Marvin, Ph.D., Cornell U. Visiting Fellow, Theatre Arts
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Cochran, Sherman G., Ph.D., Yale U. Prof., History
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Colby-Hall, Alice M., Ph.D., Columbia U. Prof., Romance Studies
Coleman, John E., Ph.D., U. of Cincinnati. Prof., Classics
Coleman, Thomas F., Ph.D., U. of Waterloo. Assoc. Prof., Computer Science
Collum, David B., Ph.D., Columbia U. Assoc. Prof., Chemistry
Connelly, Robert L., Ph.D., U. of Michigan. Assoc. Prof., Mathematics
Constable, Robert L., Ph.D., U. of Wisconsin. Prof., Computer Science
Cook, Margaret, Ph.D., U. of Washington. Asst. Prof., Classics
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Currie, Paul. Senior Lecturer, American Mime
Cutting, James E., Ph.D., Yale U. Prof., Psychology
D'Andrea, Paul, Ph.D., Harvard U. Assoc. Prof., Theatre Arts
Dannhauser, Werner J., Ph.D., U. of Chicago. Prof., Government
Darlington, Richard B., Ph.D., U. of Minnesota. Prof., Psychology
Davenny Wyner, Susan A.B., Cornell U. Assoc. Prof., Music
Davis, Tom E., Ph.D., Johns Hopkins U. Prof., Economics
Dear, Peter, Ph.D., Princeton U. Asst. Prof., History of Science/History
deBary, Bret, Ph.D., Harvard U. Assoc. Prof., History of Science
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Gitel, Carl A., Ph.D., Cornell U. Prof., Philosophy
Ginsberg, Benjamin D., Ph.D. of Chicago. Prof., Government
Ginzburg, Judith R., Ph.D., U. of California at Berkeley. Assoc. Prof., Classics
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Grimes, Joseph E., Ph.D., Cornell U. Prof., Modern Languages and Literatures
Grooss, Arthur, Ph.D., Cornell U. Prof., German Literature/Medieval Studies
Gross, Leonard, Ph.D., U. of Chicago. Prof., Mathematics
The Division of Biological Sciences provides a unified curriculum for undergraduate majors enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. Courses in biological sciences are integral to many disciplines and are basic requirements in many schools and colleges at Cornell. Graduate study in the biological sciences is administered by more than a dozen specialized fields within the Graduate School, as described in the Announcement of the Graduate School.

Organization

The Division of Biological Sciences is composed of six major sections: Biochemistry, Molecular and Cell Biology; Ecology and Systematics; Genetics and Development; Neurobiology and Behavior; Physiology; Plant Biology; and, in addition, the L. H. Bailey Hortorium and the Shoals Marine Laboratory.

The offices, research laboratories, and classrooms of biology faculty members are located in many different buildings on the campus, primarily in the Colleges of Agriculture and Life Sciences, Arts and Sciences, and Veterinary Medicine.

Student services are provided by the division's Office for Academic Affairs and the Behrman Biology Center, both located in Stimson Hall, where academic advice, information on biological sciences course offerings, other important information, and counseling are available for undergraduates. The Office for Academic Affairs also follows the progress of biology majors and works closely with faculty advisers. Additional services and resources of the Biology Center include academic program planning, tutoring, lecture tapes, examination files, and information on undergraduate research opportunities. The center has comfortable areas for studying and relaxing.

The Shoals Marine Laboratory, a cooperative venture with the University of New Hampshire, is located on Appledore Island in the Gulf of Maine. Its base office in Stimson Hall provides advising and career counseling for students interested in the marine sciences and administers the SEA Semester program for Cornell students pursuing studies at Woods Hole or aboard the schooner Westward.

Faculty


Other Teaching Personnel


Distribution Requirement

In the College of Agriculture and Life Sciences, the biological sciences distribution requirement (Group B) is for a minimum of 9 credits, including at least 6 credits of introductory biology satisfied by Biological Sciences 109–110, 105–106, or 101–103 plus 102–104. Advanced placement in biology with a score of 4 or 5 (6 or 8 credits, respectively) satisfies the requirement for introductory biology. The additional credits may be satisfied by any biological sciences courses except Biological Sciences 108 (no longer offered), 152, 200, 202, 205, 206, 301, 302, 304, or 367.

In the College of Arts and Sciences, the biological sciences distribution requirement is for a two-semester introductory biology sequence selected from Biological Sciences 109–110, 105–106, or 101–103 plus 102–104.

In the College of Human Ecology, the natural sciences distribution requirement is for at least 6 credits selected from Biological Sciences 109–110, 101–103 plus 102–104, or 105–106 or from specified courses in chemistry or physics. Advanced placement in biology with a score of 4 or 5 (6 or 8 credits, respectively) also satisfies the distribution requirement in the natural sciences.

Note: Biological Sciences 100, offered during the six-week Cornell Summer Session for 7 credits, also satisfies the distribution requirement.

Biological Sciences 101–103 plus 102–104 should be taken as a unit by students of any college. Switching from one introductory biology sequence to another at midyear may not be possible because of variation in presentation of topics. Students must receive permission of the instructor to switch sequences. Taking sequences in reverse or inconsecutive order is strongly discouraged.

The Major

The Division of Biological Sciences offers a major in biological sciences to students enrolled in either the College of Agriculture and Life Sciences or the College of Arts and Sciences. The undergraduate program is coordinated for students in both colleges through the division’s Office for Academic Affairs, where students submit their applications to the major and obtain biology faculty advisers.

During the second semester of the sophomore year, all students who intend to major in biological sciences must apply for acceptance into the major with the associate director for academic affairs, in 118 Stimson Hall. Students in the College of Agriculture and Life Sciences who were admitted directly to the major complete the application process to declare a concentration area and to assure satisfactory progress toward completion of the major. Acceptance into the major requires completion of the course sequences in introductory biology, chemistry, and mathematics (see requirements 1–3 below), plus one semester of organic chemistry lectures. In addition, a 2.75 Cornell cumulative grade-point average is required for final acceptance into the major except for those students admitted directly to the major as freshmen (College of Agriculture and Life Sciences students only) or as transfers. Students in the process of completing these prerequisites for admission to the major may be accepted on a provisional basis. Final acceptance into the major is required for graduation with a biological sciences major. It is the student’s responsibility to assure that final acceptance has been granted.

Whenever possible, students should include the introductory biology, chemistry, and mathematics sequences in their freshman schedule and complete the organic chemistry lecture course in their sophomore year. Students are not encouraged to continue with the major in biological sciences unless performance in these four subjects gives evidence of capacity to perform satisfactorily at a more advanced level.

The requirements for the biological sciences major are listed below. These courses should be taken for a letter grade, unless the course is offered for S-U grades only.

1) Introductory biology for majors (one year):

- Biological Sciences 101–103 plus 102–104, or 105–106. Biological Sciences 100, offered during the six-week Cornell Summer Session for 7 credits, also satisfies the introductory biology requirement for majors. Students may choose to accept advanced placement if they have received a score of 5 on the Advanced Placement Examination of the College Entrance Examination Board (CEEB). Students with a score of 4 must fulfill the introductory biology requirement by taking Biological Sciences 101–103 or 102–104. These students should consult information available in the course office (1140 Comstock Hall) and in the Biology Center (G20 Stimson Hall) to determine which semester to take to complete the introductory biology requirement. For students in doubt, Biological Sciences 101–103 is advised. These students receive a total of eight introductory biology credits (4 AP credits plus 4 course credits).

2) General chemistry (one year): Chemistry 207–208,* or 215–216,* or 103–104.

3) College mathematics (one year, including at least one semester of calculus): Mathematics 111–112, 105–106, or 111–105. Education 115 may not be used to fulfill any part of this requirement.

4) Organic chemistry: Chemistry 253 and 251, or 253 and 301, or 357–358 and 251, or 357–358 and 301, or 359–360 and 251, or 359–360 and 301.

5) Physics: Physics 207–208,* 112–213,* or 112–102. Students registering in Physics 208 are strongly encouraged to complete the optics branch. Those who take Physics 112–213 are advised to complete Physics 214 as well.

6) Genetics: Biological Sciences 281.

7) Biochemistry: Biological Sciences 330 or 331.

8) A concentration area selected from the outline below.

'Since modern biology has an important physical and quantitative orientation, students are advised to undertake basic courses that emphasize this approach. asterisks in the above list indicate the courses that provide this orientation, but all courses listed are acceptable.
9) **Breadth in biology**, as described below.

10) **Foreign language**: students registered in the College of Agriculture and Life Sciences must satisfy the foreign language requirement of the Division of Biological Sciences by (a) presenting evidence of successful completion of three or more years of study of a foreign language in high school or (b) attaining a score of 560 or more on the leading portion of the College Entrance Examination Board achievement test or (c) achieving “qualification” status in a language as defined by the College of Arts and Sciences or (d) successfully completing at least 6 college credits in a foreign language. Students registered in the College of Arts and Sciences must satisfy the language requirement as stated by that college.

Although not required for the biological sciences major, a course in statistics is recommended for students planning graduate study or a research career. Students should consult their faculty advisers when choosing appropriate courses in statistics.

As an alternative to requirements 8 and 9 above, students may choose to complete the Program in General Biology, outlined below.

### Concentration Areas and Requirements

As noted in the list of requirements above, students accepted into the biological sciences major must choose a concentration in the Program in General Biology. The concentration requirements are designed to help students achieve depth in one area of biology while ensuring that the selected advanced courses form a coherent and meaningful unit. Because of the flexibility allowed in satisfying these requirements, students should consult their faculty advisers. The possible concentration areas are listed below:

1. **Animal Physiology and Anatomy**: Bio S 274, The Vertebrates; Bio S 316, Cellular Physiology; Bio S 311 and 319, Introductory Animal Physiology, Lectures and Laboratory, and at least one additional course selected from the following: Bio S 313, Histology: The Biology of the Tissues; Bio S 310 and 317, Ecological Animal Physiology; Bio S 385, Developmental Biology; Bio S 389, Embryology; Bio S 458, Mammary Anatomy; Bio S 492, Sensory Function; An Sc 427, Fundamentals of Endocrinology.

2. **Biochemistry**: Biochemistry 300 or 215–216, Quantitative General Chemistry, must be taken. One of the following organic chemistry laboratory sequences must also be taken: Chemistry 301–302 or 251–252 or 301 or 251–252. In addition, students must take a physical chemistry sequence (Chemistry 389–390 or 287–288) and a biochemistry laboratory course (Bio S 638 or 430 or 630). It is recommended that students take the more rigorous organic chemistry and physics sequences (Chemistry 357–358 or 359–360 and Physics 207–208) and a third semester of calculus.

Students interested in biochemistry should complete a year of introductory chemistry other than Chemistry 103–104 before the start of their sophomore year. Students are also urged to complete introductory biology in their freshman year. Students planning graduate study in cell biology should consider taking a physical chemistry sequence (Chemistry 389–390 or 287–288).

5) **Ecology, Systematics, and Evolution**: Bio S 261, General Ecology; Bio S 378, Organic Evolution; and at least two of the following courses or one of the following courses and a 400-level, 4-credit course offered at Shoals Marine Laboratory: Bio S 248 (343), Taxonomy of Vascular Plants; Bio S 316–317, Ecological Animal Physiology; Bio S 455–457, Zoology 452–464, Limnology; Bio S 463–465, Plant Ecology; Bio S 471, Mammalogy; Bio S 473, Herpetology; Bio S 475, Ornithology; Bio S 476, Biology of Fishes; Bio S 479, Paleoecology; Bio S 484, Molecular Evolution. Students are encouraged to gain experience in some aspect of field biology through course work at a biological field station or work experience.

6) **Genetics and Development**: 9 credits, usually selected from the following courses: Bio S 378, Organic Evolution; Bio S 385, Developmental Biology; Bio S 389, Embryology; Bio S 481, Population Genetics; Bio S 482, Human Genetics and Society; Bio S 483, Molecular Aspects of Development; Bio S 484, Molecular Evolution; Bio S 485 and 487, Microbial Genetics; Bio S 486, Immunogenetics; Bio S 533, Biosynthesis of Macromolecules; Bio S 629, Molecular Biology of the Cell: Inside the Nucleus; Bio S 641, Laboratory in Plant Molecular Biology; Bio S 644, Plant Growth and Development; Bio S 653, Plant Molecular Genetics; Bio S 688, Genetics of Unculturable Eucaryotes; An Sc 419, Animal Genetics.

7) **Neurobiology and Behavior**: The two-semester introductory course sequence, Neurobiology and Behavior I and II (Bio S 221 and 222) with discussion section (4 credits per term), and 9 additional credits, of which must be a course from the neuroscience and behavior offerings. Bio S 420, 498, 499, and 720 may not be used as this neurobiology and behavior course. The remainder of the 9 credits may be in any course (such as physiology, developmental biology, cellular biology, ecology, vertebrate or invertebrate biology, or neurobiology and behavior) approved by the adviser. Courses used to fulfill the concentration requirements may not be counted toward fulfillment of the breadth requirement.

Note: Students who declare the concentration in neurobiology and behavior after taking Bio S 221 or 222 for only 3 credits must complete additional course work in neurobiology and behavior. These students should consult the chairperson of the Section of Neurobiology and Behavior (W199 Seeley G. Mudd Hall) to determine what course(s) to use to make up the deficiency.

8) **Independent Option**: Special programs for students interested in biophysics, microbiology (College of Arts and Sciences students only), or nutrition are available under this option. In addition, students who want to undertake a course of study not covered by the seven existing concentration areas, special programs, or the Program in General Biology may petition the Division of Biological Sciences Curriculum Committee. Information on independent options and Curriculum Committee petition forms are available in the Office for Academic Affairs, 118 Stimson Hall.

### Requirement for Breadth in Biology

To fulfill the requirement for breadth in biology, students must pass a total of two courses outside of their concentration area selected from two of the categories listed below.

Students should consult their faculty advisers, keeping in mind the following rules, when choosing the courses they wish to meet this requirement. A course may not count for breadth if it could be used (even if it is not) to fulfill a concentration requirement. Students may not count two courses for breadth credit if one course is a prerequisite to the other course. Students concentrating in animal physiology and anatomy; botany; cell biology; ecology, systematics, and evolution; or genetics and development should see the notes following the list of approved breadth courses.

1. **Animal Physiology and Anatomy**: Biological Sciences 214, 274, 311, 313, 315; Nutritional Sciences 331.
2. **Botany**: Biological Sciences 241, 242 and 244, 248 (343), 341 and 349, 343, 441, 448, Plant Pathology 339.
3. **Cellular Biology**: Biological Sciences 305, 316, 432, Microbiology 290.
4. **Developmental Biology**: Biological Sciences 385, 389, 483, Animal Science 220.
6. **Neurobiology and Behavior**: Biological Sciences 221, 222.

Note: Students concentrating in animal physiology and anatomy may not use Biological Sciences 316, 385, 389, or 432 to fulfill the breadth requirement.

Students concentrating in cell biology may not use Biological Sciences 222, 313, 345, or 483 to fulfill the breadth requirement.

Students concentrating in ecology, systematics, and evolution may not use Biological Sciences 248 (343) to fulfill the breadth requirement.

Students concentrating in genetics and development may not use Biological Sciences 378 or any course in group 4 to fulfill the breadth requirement.

### Program in General Biology

As an alternative to the requirements for a concentration area and for breadth in biology, students may choose to complete the Program in General Biology. These
students must fulfill all other requirements for the biological sciences major. In addition, students must complete the following:

1) Ecology (Bio S 261 or 262).
2) Neurobiology and Behavior I or II (Bio S 221 or 222).
3) A physiology course from the following: Bio S 242 and 244, or 341 and 349. Plant Physiology; Bio S 311, Introductory Animal Physiology; Lectures; Bio S 315, Ecological Animal Physiology. Lectures.
4) One course from the following: Bio S 241, Plant Biology; Bio S 248 (343), Taxonomy of Vascular Plants; Bio S 262. The Vertebrates; Entom 215, Insect Biology; Micro 290 and 291, General Microbiology.
5) At least one course offered by the Division of Biological Sciences concentrating on plants. This may be satisfied by a course that also fulfills requirement 3 or 4.
6) At least one course offered by the Division of Biological Sciences with a laboratory. This may be satisfied by a course that also fulfills requirement 3, 4, or 5.
7) A biological sciences course offered for 2 or more credits having as a prerequisite one of the following: Bio S 221, Neurobiology and Behavior; Bio S 222, Neurobiology and Behavior II; Bio S 241, Plant Biology; Bio S 242 or 341, Plant Physiology; Bio S 261 or 262, The Vertebrates; Bio S 274, The Vertebrates; Bio S 281, Genetics; Bio S 311, Introductory Animal Physiology; Lectures; Bio S 315, Ecological Animal Physiology, Lectures; Bio S 330 or 331, Principles of Biochemistry.

Independent Research and Honors Program

Individual research projects under the direction of a faculty member are encouraged as part of the program of study within a concentration. Applicants for research projects are accepted by the individual faculty members, who take into account students' previous academic accomplishments, interests, and goals and the availability of space and equipment suitable for the proposed project. Students accepted for independent research enroll for credit in Biological Sciences 499 (Undergraduate Research in Biology) with the written permission of the faculty supervisor. Students register for this course in 185 Stimson Hall. Any faculty member in the Division of Biological Sciences may act as a supervisor. Faculty supervisors outside the division are acceptable only if a faculty member of the division agrees to take full responsibility for the quality of the work. Information on faculty research activities and undergraduate research opportunities is available in the Behrman Biology Center, G20 Stimson Hall.

Research credits may not be used in completion of the following concentration areas: animal physiology and anatomy; biochemistry; botany; cell biology; ecology, systematics, and evolution; and genetics and development. No more than 4 credits of research may be used in completion of the concentration area in neurobiology and behavior.

The honors program in biological sciences is designed to offer advanced training in laboratory or field research through the performance of an original research project under the direct guidance of a member of the faculty. Applications for the honors program are available in the Office for Academic Affairs, 118 Stimson Hall, and must be submitted to the Honors Program Committee by the deadline announced early in the senior year. To qualify for the program, students must have completed at least 30 Cornell cumulative grade-point average of at least 3.00. In addition, students must have at least 3 Cornell cumulative grade-point average in all biology, chemistry, mathematics, and physics courses. (Grades earned in courses in other departments that are used to fulfill major requirements are included in this computation.) In addition, candidates must have a faculty member to supervise their research. Any faculty member in the Division of Biological Sciences may act as a supervisor. Students may also work with faculty supervisors outside the division. Students who select supervisors outside the division must arrange for a faculty member of the division to serve as co-supervisor of the research. The division co-supervisor must agree to meet with the student on a regular basis, to report to the Honors Program Committee on the progress of the work approximately two months before the thesis is due, and to serve as a reviewer of the thesis. An honors candidate usually enrolls for credit in Biological Sciences 499 (Undergraduate Research in Biology) under the direction of the faculty member acting as honors supervisor, although it is not necessary to do so.

Requirements of the honors program include participation in honors research seminars during two semesters, submission of an acceptable honors thesis, completion of all major requirements, and maintenance of the 3.00 Cornell cumulative grade-point average through graduation. Recommendation to the faculty that a candidate graduate with honors is the responsibility of the Honors Program Committee.

Students interested in the honors program should consult their faculty advisers early during their junior year. Students are strongly encouraged to begin their research projects in their junior year, although they are not formally admitted to the honors program until the beginning of their senior year. Details pertaining to thesis due dates, seminars, and other requirements may be obtained from the chairperson of the Honors Program Committee or from the Office for Academic Affairs, 118 Stimson Hall. Information on faculty research activities is available in the Behrman Biology Center, G20 Stimson Hall.

Curriculum Committee

Many decisions pertaining to the curriculum, to division-wide requirements, and to concentration and breadth areas are made by the Curriculum Committee of the division. The committee consists of faculty and elected student members and welcomes advice and suggestions from all interested persons.

Advising

Students in need of academic advice are encouraged to consult their advisers, come to the Behrman Biology Center (G20 Stimson Hall), or contact the academic director for academic affairs (118 Stimson Hall). Students interested in marine biology should visit the Cornell Marine Programs Office, G4 Sherrill Hall.

Students interested in the multidisciplinary program Biology and Society should see "Special Programs and Interdisciplinary Studies," in the College of Arts and Sciences section of this catalog.

Index of Courses

The middle digits of biological sciences course names are used to denote courses in specific areas: 0, general; 1, animal physiology and anatomy; 2 and 9, neurobiology and behavior; 3, biochemistry and cell biology; 4, botany; 6 and 7, ecology, systematics, and evolution; 8, genetics and development. The middle digit 5 is used when all other course numbers in a major area have already been assigned.

Note: Biological sciences courses count as agriculture and life sciences credits for students in the College of Agriculture and Life Sciences and as arts and sciences credits for students in the College of Arts and Sciences.
### General Courses

**101–102 Biological Sciences, Lectures** 101, fall; 102, spring. 2 credits each term. Prerequisite: concurrent enrollment in Biological Sciences 101 (fall) or 104 (spring). Passing grade (D or better) in 101 is prerequisite to 102 unless written permission is obtained from instructor. S-U grades optional, with permission of instructor. May not be taken for credit after Biological Sciences 105–106 or 109–110. Lec. M, W, F 9:05 to 10:05 or 10:10 to 11:10 each week; to accommodate these, students must reserve all 3 days. Evenings: prelims. fall, Oct. 1 and Nov. 5, spring, Feb. 25 and Apr. 5. K. K. Adler. Designed both for students who intend to specialize in biological sciences and for those specializing in other subjects, such as the social sciences or humanities, who wish to obtain a thorough knowledge of biology as part of their general education. Plant and animal materials are considered together rather than in separate units. The fall semester covers the chemical and cellular basis of life; energy transformations, anatomy, physiology, and behavior. The spring semester covers genetics, development, evolution, ecology, and the origin of life. Each topic is considered in the light of modern evolutionary theory.

**103–104 Biological Sciences, Laboratory** 103, fall; 104, spring; 2 credits each term. Prerequisite: concurrent enrollment in Biological Sciences 101 (fall) or 104 (spring). 103 is prerequisite to 104 unless written permission is obtained from instructor. S-U grades optional, with permission of instructor. No admittance after second week of classes. Lab, M, W, Th, or Fri. 1:25–4:25, M or W 7:30–10:30 p.m. or, T or R 8–11. One 3-hour lab each week and a weekly lec for discos, special lecs, etc. J. C. Glaeser, P. R. Ecklund, and staff. Biological Sciences 103–104 is designed to give students laboratory experience with major biological phenomena in order to support an understanding of the important concepts, principles, and theories of modern biology. A second objective of the laboratory course is to help students gain expertise in the methods used by biologists to construct new knowledge. Students are exposed to basic concepts, research methods, including laboratory and data transformation techniques, and instrumentation in the major areas of biology. First semester topics include biochemistry, physiology, organismal diversity, and behavior. In the second semester laboratory experience is provided in the areas of genetics, development, plant biology, organismal diversity, population genetics and growth, and ecology.

**105–106 Introductory Biology** 105, fall; 106, spring. 4 credits each term (or 2 credits for transfer students, with permission of instructor). Enrollment limited to 200 students. Prerequisite: 105 is prerequisite to 106. Written permission is obtained from instructor. S-U grades optional, with written permission of instructor. May not be taken for credit after Biological Sciences 101–104 or 109–110. No admittance after second week of classes. Fee: $5. Lec. T, Th 9:00; additional study and lab hours to be arranged. R. W. Bouna, E. R. Loew, C. H. McFadden, and staff. Designed primarily for biology majors, preprofessional students, and other students who desire a challenging, broad introduction to fundamental concepts of biology. Physiology, anatomy, and biochemistry are strongly emphasized in the fall semester. Subjects of study in the spring semester are genetics, development, ecology, evolution, behavior, and the diversity of organisms. The course uses an autotutorial format and offers considerable flexibility in scheduling. Course requires mastery of a group of core units. Testing on these units is primarily by oral examination. Three formal laboratory sessions are offered each semester. Written reports on experimental work are required in the fall; extensive dissection with practical exams constitute spring laboratories. The core units include additional laboratory work. Performance on the core units, the laboratories and additional assignments, and the final examination determine the final grade. Students who object to dissecting live invertebrates may want to take another biology course.

**109–110 Biological Principles** 109, fall; 110, spring. 3 credits each term. Limited to 600 students. Prerequisite: 109 is prerequisite to 110 unless written permission is obtained from the instructor and student has a least 3 credits of college biology. Letter grades may only be taken for credit after Biological Sciences 101–104 or 105–106. This course may be used to fulfill the distribution requirement in the Colleges of Agriculture and Life Sciences, Arts and Sciences, and Human Ecology but may not be used as an introductory course for the major in biological sciences. Note that this course may not always satisfy the prerequisites for second- and third-level courses in biology.

**200 Special Studies in Biology** Fall or spring. 1–3 credits. Prerequisites: transfer- or special-student status and written permission of instructor and of the associate director of the Division of Biological Sciences. Students must register using a special form available in Stimson 118. S-U grades optional, with permission of instructor. Hours to be arranged. Staff. Permission is obtained for students who want to take only a portion of a regular biological sciences course—for example, only the lectures or only the laboratory in a course that includes both. Only students who have had normal training equivalent to a regular course that is to be omitted may register in this manner. May not be substituted for 100-level courses and may not be used in fulfillment of college distribution requirements.

**202 History of Biology** (also Biology and Society 288 and History and Society 288) Spring. 3 credits. Prerequisite: one year of introductory biology S-U grades optional. Lecs., T, R 10:10–11:25, W, B. Provine. An examination of the history of biology, emphasizing the interaction of biology and culture. Original writings of biologists constitute the bulk of reading assignments. Covers the period from classical antiquity to the present, but primary emphasis is on twentieth-century biology.

**205 Ethics and Medicine** (also Biology and Society 205 and Philosophy 245) Fall. 4 credits. Limited to 50 students. Open to sophomores, juniors, and seniors; permission of instructor required for graduate students. Lecs., T, R 10:10–11:25, W, B. Provine. Critical analysis of the conceptual frameworks in which ethical problems associated with medicine can be formulated and evaluated. General topics (with sample issues) include basic concepts such as illness, death, autonomy, and personhood (abortion, euthanasia, procreative technologies); allocation of medical resources (entitlement to health care, access to health care, cost-benefit analysis); and the professional-patient relationship (informed consent, confidentiality, and medical paternalism).

**206 Environmental Ethics** (also Biology and Society 206 and Philosophy 246) Fall. 4 credits. Open to sophomores, juniors, and seniors; permission of instructor required for graduate students. Lecs., T, R 1:25–2:40, disc. 1 hour each week to be arranged. M. Wachsbarg. Critical analysis of the conceptual frameworks in which policies affecting the environment are formulated and judged. One major component of the course deals with the nature and extent of obligations to spatially distant people, future generations, nonhuman animals, and nonsentient things (e.g., the ecosystem). The other major component of the course deals with the appropriate analysis of the origin and resolution of environmental problems. Topics include individual vs. collective goods, cost-benefit analysis, and coordination problems.

**207 Evolution** Fall. 3 credits. Intended for students with no background in college biology. S-U grades optional. Lecs., T, R 10:10; disc, to be arranged. W. B. Provine. Evolution is the central concept in biology. This course examines evolution in historical and cultural context. Aims of the course include understanding the major issues in the history and current status of evolutionary biology and exploring the implications of evolution for culture. Issues range from controversies over mechanisms of evolution in natural populations to the conflict between creationists and evolutionists.

**301 Biology and Society: The Biocultural Perspective** (also Anthropology 301 and Biology and Society 301) Fall. 3 or 4 credits (3 credits by arrangement with instructor; 4-credit option required of Biology and Society majors). Prerequisite: one year of introductory biology S-U grades optional. This is the
core course for the biology and society major and is also open to other students who have fulfilled the prerequisite.

Lecs, T R 8:40–9:55. D. J. Greenwood. Human biology, behavior, and institutions are understood in modern evolutionary theory as the ongoing products of interactions between human biological evolution and cultural change. Nevertheless, numerous attempts to examine evolutionary processes in humans violate key tenets of evolutionary theory, unwittingly reproducing elements of pre-Darwinian views of human nature. After reviewing the pre-Darwinian context at the beginning of the semester, the course explores applications of evolutionary analysis to humans and develops a cultural explanation of the persistence of pre-Darwinian elements in many of them.

305 Basic Immunology, Lectures (also Veterinary Medicine 315) Fall. 3 credits. Strongly recommended for core courses in microbiology, biochemistry, and genetics.


307 Basic Immunology, Laboratory (also Veterinary Medicine 316) Fall. 2 credits. Prerequisite: one course in basic microbiology or permission of instructor. Recommended: concurrent enrollment in Biological Sciences 305. Labs, T R 10:10–11:10. N. L. Norkos. A series of laboratory exercises designed to illustrate immunological concepts presented in Biological Sciences 305. Exercises are designed to give students experience with the stimulation and measurement of an immune response to antigens. Techniques to familiarize students with both humoral and cellular immune phenomena are included, with the goal of obtaining hands-on experience in immunology. Among the topics covered are antigen presentation and precipitation methods, virus neutralization and phagocytosis, measurement of the biological activity of complement components, antibody-dependent cell-mediated cytoxidcsis, T and B cell identification, monoclonal antibodies and the ELISA, antibody production by single cells, lymphocyte blastogenesis, and delayed hypersensitivity.

308 Pathogenic Microbiology (also Veterinary Medicine 317) Spring. 2 or 4 credits (2 credits with lecture only). Limited to 20 students. Prerequisites: Microbiology 290 and 291. Recommended: Biological Sciences 307.

Lecs, T R 1:25; labs, T R 2:30–5. Evening prelimes to be arranged. J. E. Barlough, L. E. Winter. A course in medical microbiology. Lectures discuss the bacteria, fungi, and viruses that cause disease in humans. Emphasis is on the pathogenic mechanisms of the microbes and the interrelationships that exist between the host and the microbe. Laboratory sessions are involved with the isolation, culture, and identification of the microbes and the further study and demonstration of the disease process through use of laboratory animal models and tissue cultures.

400 Undergraduate Seminar in Biology Fall or spring. Variable credit (1–3 credits assigned for individual seminar offerings). May be repeated for credit. S–U grades optional.

Sen. to be arranged. Staff. From time to time specialized seminars on topics of interest to undergraduates are offered by visiting faculty or faculty from the Sections of Ecology and Systematics, Genetics, Development, and Plant Biology. Topics and instructors are listed in the division’s catalog supplement issued at the beginning of the semester.

406 Biotechnology, Society, and Law (also Biology and Society 406) Spring. 4 credits. Prerequisites: a course in genetics and a course in biochemistry, with written permission of instructor. Limited to 20 students. S–U grades optional. Fee for course reading materials.

Sem, T R 2:30–4:25. J. M. Fessenden-Raden, M. W. Shaw. Human biology students, with their implied power in areas such as medicine and law, may advance more rapidly than social institutions can productively use and prudently control them. This course explores issues in the use and potential abuse of applications of biotechnology (e.g., DNA fingerprinting, gene therapy, genes as diagnostics). Readings are from science, medicine, law, ethics, and public policy. A research paper is required.

469 Food, Agriculture, and Society (also Biology and Society 469) Spring. 3 credits. Prerequisite: an introductory ecology course or permission of instructor. S–U grades optional. Possible fee for course reading materials.

Lecs, T R 1:25–2:40. A. G. Power. A multidisciplinary course dealing with the social and environmental impact of food production in the United States and in developing countries. Agroecosystems of various kinds are analyzed from biological, economic, and social perspectives. The impacts of traditional, conventional, and biotechnology agricultural technologies are critically examined in the context of developed and developing economies. Specific topics include pest management, soil conservation, farm labor, land reform, biotechnology, and international food policy.

489 Teaching Experience Fall or spring. 1–4 credits. Enrollment limited. Prerequisites: previous enrollment in the professional preparation, and written permission of instructor. S–U grades optional. Permission of instructor. Students in the College of Arts and Sciences may not count credits from this course toward the 120 credits required for graduation.

Hours to be arranged. Staff. Designed to give qualified undergraduate students teaching experience through actual involvement in planning and assisting in biology courses. This experience may include supervised participation in a discussion group, assisting in a biology laboratory, assisting in field biology, or tutoring. Biological sciences courses currently offering such experience include Biological Sciences 105–106, 231, 274, 311, 319, 330, 430, and 475.

499 Undergraduate Research in Biology Fall or spring. Variable credit. Students in the College of Arts and Sciences may act as a supervisor. Faculty supervisors outside the division are acceptable only if a faculty member of the division agrees to serve as cosigner, with special reference to the availability of research projects requiring electron microscopy. Students must register in the Office for Academic Affairs in Stimson 118. Each student must submit an independent study statement describing the proposed research project during course registration. (Special forms for this purpose are available in the college offices.) S–U grades optional.

Any faculty member in the Division of Biological Sciences may act as a supervisor. Faculty supervisors outside the division are acceptable only if a faculty member of the division agrees to serve as cosigner, taking full responsibility for the quality of the work. Hours to be arranged. Faculty supervisors must contact the Office of Academic Affairs in Stimson 118 for registration forms. Students are critically examined in the context of developed and developing technologies, stressing the use and potential abuse of applications of biotechnology, such as ultrathin sectioning, negative staining, study of macromolecules, and interpretation of results. A brief introduction to quantitative electron microscopy is also included.

603 Transmission Electron Microscopy for Biologists Fall. 3 credits. Primarily for graduate students but open to upperclass students. Limited to 12 students, with preference given to students with research projects requiring electron microscopy.

Prerequisites: either Biological Sciences 313, 345, or 347, or equivalent, and written permission of instructor. Registration during course enrollment required. S–U grades optional.

Lec, T 11:15; labs, M W 1:25–4:25, T R 1:25–4:25, or W F 8–11. M. V. Parthasarathy. Principles of electron microscopy, techniques for electron microscopy, such as ultrathin sectioning, negative staining, study of macromolecules, and interpretation of results. A brief introduction to quantitative electron microscopy is also included.

606 Freeze-Fracture Technique Spring, weeks 7–12. 1 credit. Primarily for graduate students. Limited to 8 students. Prerequisites: Biological Sciences 603 or equivalent, and permission of instructor. S–U grades only.


608 Advanced Electron Microscopy for Biologists Spring, weeks 10–14. 1 credit. Primarily for graduate students. Limited to 6 students. Prerequisites: Biological Sciences 603 or equivalent. S–U grades only. Hours to be arranged. M. V. Parthasarathy. Project in biological ultrastructure.

702 X-Ray Elemental Analysis in Biology Spring, weeks 7–14. 1 credit. Limited to 6 students. Prerequisites: Advanced electron microscopy or equivalent, and permission of instructor. S–U grades only. Offered alternate years.

Lec and lab to be arranged. M. V. Parthasarathy, C. Daugherty. Principles of X-ray elemental analysis are discussed, with special reference to the energy-dispersive system. Emphasis is on qualitative elemental analysis of biological specimens and preparation of material for such analysis, including freeze-substitution technique. A brief introduction to quantitative elemental analysis is also given.

Animal Physiology and Anatomy


Lecs, T R 8:30–9:55; occasional disc to be arranged. J. E. Fortune. The structural and functional differences between the sexes are examined. Emphasis is placed on mechanisms of mammalian reproduction; where possible, special attention is given to studies of humans. Current evidence on the effects of gender on nonreproductive aspects of life (behavior, mental and physical capabilities) is discussed. The course is intended to provide students with a basic knowledge of reproductive endocrinology and with a basis for objective evaluation of sex differences in relation to contemporary life.]
An introduction to the evolution, classification, studies of selected aspects of vertebrate life.

311 Introductory Animal Physiology, Lectures (also Veterinary Medicine 346) Fall 3 credits. Prerequisites: one year of college biology, chemistry, and mathematics.
A general course in vertebrate physiology emphasizing the basic characteristics of the circulatory, nervous, pulmonary, renal, and gastrointestinal systems; endocrinology; and reproductive anatomy and physiology. Neural and hormonal control of function is emphasized.

313 Histology: The Biology of the Tissues Fall 4 credits. Prerequisite: one year of introductory biology. Recommended: background in vertebrate anatomy and organic chemistry or biochemistry.
Lecs, T R 11:15; labs, T R 2–4:25. Staff.
Provides students with a basis for understanding the microscopic, functional, and organizational aspects of vertebrates, as well as the methods of analytic morphology at the cellular and tissue levels. The dynamic interrelations of structure, composition, and function in cells and tissues are emphasized.

315 Ecological Animal Physiology, Lectures Fall 3 credits. Prerequisite: one year of introductory biology.
Lecs, M W F 10:10. W. N. McFarland and staff. An introductory course for students interested in ecology and the characteristics of the physical environment that are important to organisms are discussed, and representative physiological, behavioral, and morphological adaptations of vertebrate and invertebrate animals to their environments are analyzed.

316 Cellular Physiology Spring 4 credits. Limited to 100 students, with preference given to students concentrating in animal physiology and anatomy. Each lab limited to 24 students. Prerequisite: concurrent or previous enrollment in Biological Sciences 330 or 331.
Lecs, M W F 9:05; lab, M T W R 1:25–5. A. Quarioni and staff.
Lectures introduce students to the most current information on the ways cells function and regulate themselves and neighboring cells and on what molecules are involved in these regulatory processes. Laboratories provide an introduction to the cell and organ culture and to immunological techniques used to study cell structure and function in vivo and in vitro. Experiments performed in the laboratory are closely related to, and provide practical experience with, subjects covered in the lectures.

317 Ecological Animal Physiology, Laboratory Fall 1 credit. Limited to 12 students. Prerequisite: concurrent enrollment in Biological Sciences 315. Offered alternate years. Not offered 1987–88; offered 1988–89.
Exercises involve measurement of important environmental factors in local habitats, and laboratory experiments to familiarize students in the use of ecophysiological concepts.

319 Introductory Animal Physiology, Laboratory (also Veterinary Medicine 247) Fall 2 credits. Limited to 80 students, with preference given to students concentrating in animal physiology and anatomy. Each lab limited to 20 students. Prerequisite: concurrent or previous enrollment in Biological Sciences 311 or permission of instructor based on previous meritorious performance in another introductory physiology course.
A series of exercises designed to illustrate basic physiological processes in animals, including mammals. Students learn scientific methodology and analyses of results by actual performance of the exercises. Reports of laboratory activities are required. Grading is based on evaluation of these reports and on laboratory performance.

410 Seminar in Anatomy and Physiology Fall or spring 1 credit. May be repeated for credit only once. Limited to upperclass students. S-U grades only. 
Sem to be arranged. Organizational meeting first W of each semester at 7:30 p.m. in Stimson 105. Staff (coordinator, R. H. Wasserman).
Discussions and seminars on specialized topics in animal physiology and anatomy. Fall: effects of endogenous and exogenous excitants and depressants on reproduction (A. van Tienhoven); Spring: regulation of cell processes (J. F. Wootton).

411 Comparative Neuroendocrinology (also Entomology 411) Spring 3 credits. Prerequisite: Biological Sciences 311 or Entomology 483.
A comparison of the interactions of the nervous and endocrine systems in invertebrates and vertebrates, from Hydra to humans. Areas covered include morphology, development, evolution, physiology, and molecular biology of neuroendocrine glands and their hormones.

458 Mammalian Physiology Spring 6 credits. Enrollment limited. Graduate student auditors allowed in lectures. Prerequisite: Biological Sciences 311 or equivalent with permission of instructor.
Lecs, M W F 9:05; lab, M 1:25–4:25; 4 additional hours to be arranged. K. W. Beyenbach and staff. 
Selected topics in mammalian physiology are discussed in the lecture and concurrently studied in the laboratory. Topics are selected from the following: physiology of excitable and epithelial cell membranes, the autonomic nervous system, cardiovascular physiology, gastrointestinal physiology, renal physiology, respiratory physiology, and acid-base balance.

615 Nutrition and Physiology of Mineral Elements (also Veterinary Medicine 759 and Nutritional Sciences 659) Fall 2 credits. Prerequisites: courses in basic physiology, intermediary biochemistry, and general nutrition. Offered alternate years. Not offered 1986–87.
Lecs, T R 7:30; 4 additional hours to be arranged. W. H. Wasserman, R. Schwartz, D. R. Van Campen.
Lectures on nutritional aspects and physiological, biochemical, and hormonal relationships of the prominent macroelements and microelements, with emphasis on recent developments. Information on methodologies of mineral research and the requirements for and essentially, transport, function, homeostasis, interrelationships, and toxicity of various mineral elements.

616 Radioisotopes in Biological Research (also Veterinary Medicine 750) Fall 4 credits. Prerequisites: courses in animal or plant physiology, or permission of instructor. Offered alternate years. Not offered 1986–87.
Lecs, T R 11:15; lab, T 1:25–5. F. W. Lengemann. Lectures and laboratories deal with the radioisotope as a tool in biological research. Among the topics considered are the use and detection of beta-emitting isotopes, gamma spectrometry, Cerenkov counting, neutron activation, autoradiography, and isotope dilution. Emphasis is placed on liquid scintillation counting techniques. Experiments are presented in which tritium is used as a metabolic tracer. Experiments are designed to present basic principles using plants and animals as subject material. This course is acceptable to the Office of Graduate Research for certification of the student as a radioisotope user at Cornell University.

618 Biological Membranes and Nutrient Transfer (also Veterinary Medicine 752) Spring 2 credits. Prerequisite: courses in animal or plant physiology, quantitative and organic chemistry, and physics.
Recommended: a course in cellular physiology. S-U grades optional, with permission of instructor. Offered alternate years.
Lecs, T R 11:15. R. H. Wasserman.
An introduction to elementary biophysical properties of biological membranes; theoretical aspects of permeability and transport; mechanism of transfer of inorganic and organic substances primarily across epithelial membranes; and characteristics and properties of transporting macromolecules and ion channels.

619 Lipids (also Nutritional Sciences 602) Fall 2 credits.
Lecs, T R 11:15. A. Benadoun.
Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is placed on critical analysis of current topics in lipid methodology; lipid absorption; lipoprotein secretion, molecular structure, and catabolism; mechanism of hormonal regulation of lipolysis and fatty acid synthesis, and cholesterol metabolism and atherosclerosis.

558 Molecular Mechanisms of Hormone Action (also Veterinary Medicine 758) Spring 2 credits. Prerequisite: permission of instructor. Minimum enrollment of 6 required. Offered alternate years.
An advanced course developed from the current literature on endocrine mechanisms.

710–718 Special Topics in Physiology Fall or spring 1 or 2 credits for each topic. May be repeated for credit. Enrollment in each topic may be limited. S-U grades optional, with permission of instructor.
Lectures, laboratories, discussions, and seminars on specialized topics.
Fall 1987: three topics are offered.

711 Pathophysiology of Calcium Metabolism: Hypertension, Osteoporosis, Arteriosclerosis 1 credit.
Sem, 1 hour each week to be arranged. R. H. Wasserman.

713 Epithelial Transport of Salt and Water (also Biological Sciences 410) 1 credit.
Sem, 1 hour each week to be arranged. K. W. Beyenbach.

717 Structure and Function of Joints with Emphasis on Arthritis 1 credit.
Lec, 1 hour each week to be arranged. G. Lust.
Spring 1988: four topics are offered.

712 Regulation of Cell Processes (also Biological Sciences 410) 1 credit.
Sem to be arranged. J. F. Wootton.

714 Physiology of Pregnancy 2 credits.
Lab to be arranged. F. W. Nathaniel.

716 Seminar on Insect Physiology (also Entomology 685) 1 credit. Prerequisite: permission of instructor.
Sem, 1 hour each week to be arranged. H. H. Hagedorn.

718 Evolution of Color Vision 1 credit.
Sem, 1 hour each week to be arranged. E. R. Loew.

719 Graduate Research in Animal Physiology (also Veterinary Medicine 600) Fall or spring 1 credit. Variable credit. Prerequisites: written permission of the section chairperson and of the staff member who supervises the work and assigns the grade. S-U grades optional.
Hours to be arranged. Staff.
Similar to Biological Sciences 499 but intended for graduate students who are working with faculty members on an individual basis.
753 Animal Biotechnology. Fall. 3 credits. Prerequisites: two courses in physiology, two courses in biochemistry, and one course in endocrinology or nutrition.

Lec and disc. M 11:15; lab. M 1:25–4:20; additional hours to be arranged. W. Hansel and staff.

A course in animal biotechnology designed to prepare students for research in animal genetic engineering. Standard techniques for cloning DNA in bacteria are discussed. Development of expression systems in bacteria, yeast, and mammalian cells; DNA sequencing and analysis; and insertion of DNA into mammalian embryos are carried out in the laboratory.

Related Courses in Other Departments

Adaptations of Marine Organisms (Biological Sciences 413)

Advanced Work in Animal Parasitology (Veterinary Medicine 737)

Animal Development (Veterinary Medicine 507)

Animal Reproduction and Development (Animal Science 220)

Developmental Biology (Biological Sciences 385)

Embryology (Biological Sciences 389)

Fundamentals of Endocrinology (Animal Science 427–428)

Insect Morphology (Entomology 322)

Integration and Coordination of Energy Metabolism (Biological Sciences 637 and Nutritional Sciences 638)

Neuroanatomy (Veterinary Medicine 504)

Sensory Function (Biological Sciences 492)

Teaching Experience (Biological Sciences 498)

Undergraduate Research in Biology (Biological Sciences 499)

Biochemistry, Molecular and Cell Biology

132 Orientation Lectures in Biochemistry. Spring, weeks 1–3. No credit. Primarily for freshmen, sophomores, and transfer students. S-U grades only (registered students receive an unsatisfactory grade for nonattendance).

Lec, S 10:10–11:30 for first 3 S of semester, Section chairperson.

Discussions by six professors about their research and promising areas for research in the future.

231 General Biochemistry. Fall. 3 credits. Intended for students who have not studied biochemistry previously and who do not expect to pursue it further. Not recommended for students who have taken organic chemistry. Prerequisite: Chemistry 104 or 208 or equivalent. S-U grades optional.


A brief introductory section relating organic chemistry to biochemistry is given, followed by the biochemical material appropriate for the first semester of introductory courses. Topics of general interest are also included.

232 Recombinant DNA Technology and Its Applications (also Biology and Society 232). Spring, 3 credits. Prerequisite: one year of introductory biology S-U grades optional.


An introduction to molecular approaches to biology. Basic concepts underlying recombinant DNA technology together with strategies for cloning genes are discussed. Much of the course deals with applications of recombinant DNA technology to basic research and to biotechnology. Applications to be discussed include screening for genetic diseases; plant improvement; and production of insulin, interferon, blood-clotting factors, growth hormones, vaccines, and feed-stock chemicals. Historical, regulatory, social, and ethical issues are presented and discussed. Recommended especially for sophomores desiring a firm background in recombinant DNA technology in preparation for taking genetics and biochemistry. Also appropriate for the layperson who wants to understand some new research discoveries and applications stemming from them.

330–331 Principles of Biochemistry. Fall or spring. 4 credits (2 credits if taken after Biological Sciences 231). Prerequisite: each term. May be repeated for credit. Offered alternate years.

Lec and disc. M W F 8 or 10:10 or to be arranged; additional hours in the Study Center to be arranged. No formal lectures. Evening prelim October 22 (fall); March 15 (spring). Fall: M. Foger and staff; spring: M. Foger, R. Wu, and staff.

The core material of the course includes protein structure and function, enzymes, basic metabolic pathways, DNA, RNA, protein synthesis, and an introduction to the field of cloning. The course has an autotutorial format. The core material is divided into twelve units of work that are outlined in a study guide written to accompany the textbook. Students prepare the work on their own, with help from the staff of the Study Center if desired. Students must pass a quiz on each unit to obtain a grade of C+. Students who want to go beyond the core material have available a wide range of electives, including class discussions of research papers and review articles and individual work on assigned problems. Grades above C+ are determined by the amount of elective work satisfactorily completed and by the midterm and final exams. Missed deadlines or very poor exam scores result in grade penalties.

333 Principles of Biochemistry, Lectures. Fall or 6-week summer session. 4 credits (2 credits if taken after Biological Sciences 231). Enrollment may be limited to 400 students in fall. Prerequisite: Chemistry 253 or 358 or equivalent. May not be taken for credit after Biological Sciences 331. S-U grades optional for graduate students only.


Chemistry of biological substances, presented in lecture format. Course content is similar to that of Biological Sciences 330.

430 Basic Biochemical Methods. Fall or spring. 4 credits. Enrollment limited. Prerequisites: Biological Sciences 330 or 331, organic chemistry lectures and laboratory, and permission of instructor obtained by preregistering in Stimson 259. Concurrent registration in Biological Sciences 330 or 331 may be arranged in the fall term for graduate students.


A laboratory course designed to introduce students to the biochemical techniques commonly used in the study of biological materials. Students work in small groups, and each student rotates among four modules, including two of his own choice. Various assay methods, column chromatography, electrophoresis, and use of the scintillation counter are taught in an enzymeology module taken by all students. Methods used in the laboratory are applied to analyses of blood and urine samples, and some nutritional analyses are done for protein and vitamin contents of foods. In the cell component unit, procedures of cell fractionation are introduced and the unique functions of various organelles are examined. In the nucleic acid module, students are introduced to recombinant DNA methodology, isolating DNA, and studying the function of transfer RNA. The lipid module includes isolation and purification procedures, thin-layer chromatography, and cholesterol and phosphate analyses.

432 Survey of Cell Biology. Spring. 3 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent.

Lecs, M W F 11:15. W. Brown and staff.

A survey of a wide array of topics focusing on the general properties of eucaryotic cells. The topics include methods used for studying cells, the structure and function of the major cellular organelles, and analyses of cellular processes such as mitosis, endocytosis, cell motility, secretion, cell-to-cell communication, gene expression, and oncogenesis. Some of the material is covered in greater depth in Biological Sciences 438, 483, 632, 636, and 639.

435–436 Undergraduate Biochemistry Seminar 435, fall; 436, spring. 1 credit each term. May be repeated for credit. Limited to upperclass students. Prerequisite: Biological Sciences 330 or 331 or written permission of instructor. S-U grades optional, with permission of instructor.

Sem is to be arranged. Organizational meeting first W of each semester at 4 p.m. Fall: V. M. Vogt; spring: D. B. Wilson.

Selected papers from the literature on a given topic are evaluated critically during six or seven two-hour meetings. Fall: virus replication; spring: protein export.

438 Cell Proliferation and Oncogenic Viruses (also Toxicology 438). Spring, 3 credits. Prerequisite: Biological Sciences 330 or 331. Recommended: Biological Sciences 281.


A description of the growth properties of animal cells in culture, followed by discussions of the changes in cells that are induced by tumor viruses and carcinogens. Topics include immortalization of cells, the cell cycle, macromolecular growth factors, cell-surface properties, cell cytoskeleton, transcription and translation of papovavirus and retrovirus genes, and structure and function of viral and cellular onc genes.

630 Laboratory in Cell Biology. Spring. 4 credits. Enrollment limited. Prerequisites: a course in biochemistry or cell biology, and permission of instructor obtained by registering in Wing 106 with J. E. Blankenship.

Labs, M W 1:25–4:25 or R 9:05–4:25; disc to be arranged. R. E. McCarty, J. E. Blankenship, and staff.

The course emphasizes techniques for handling and experimenting with cells of different kinds and provides experience in experimental design.

631 Protein Structure and Function. Fall. 2 or 3 credits (3 credits with discussion). Prerequisites: introductory biochemistry, physical chemistry, and organic chemistry. Permission of instructor required for discussion. S-U grades optional for lecture; S-U grades only for laboratory.


Lectures on protein structure and the nature of enzymatic catalysis. Discussions cover some of these areas in more depth, through recent research papers.

632 Membranes and Bioenergetics. Spring. 2 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent. Offered alternate years.


Structure and dynamics of biological membranes, physical methods, model membranes, ionophores, ion-transport ATPases, mitochondrial adenine nucleotide translocation, and examples of transport from plants, animals, and bacteria.

248 Biological Sciences
Biochemistry, Molecular and Cell Biology 249

633 Biosynthesis of Macromolecules Fall. 2 or 3 credits (3 credits with discussion and permission of instructor). Disc limited to 15 students. Prerequisite: Biological Sciences 330 or 331. Recommended: Biological Sciences 281. Lecs, T R 9:05, disc, 1 hour each week to be arranged. J. W. Roberts, D. B. Wilson. Synthesis of DNA, RNA, and proteins, and regulation of gene expression.

634 Biochemistry of the Vitamins and Coenzymes (also Nutritional Sciences 634) Spring. 2 credits. Prerequisites: Biological Sciences 330 or 331 or equivalent and either Chemistry 358 or 360. Offered alternate years. The chemical, biochemical, and nutritional aspects of the vitamins and coenzymes.

635 Mechanisms of Metabolic Regulation (also Nutritional Sciences 635) Spring. 2 credits. Prerequisites: Biological Sciences 330 or 331 and either Chemistry 258 or 360, or permission of instructor. Offered alternate years. Lecs, T R 10:10. M. N. Kazaninoff. The intracellular mechanisms of regulation are emphasized, with specific examples in mammalian metabolism examined in detail.

636 Molecular Biology of the Cell: Outside the Nucleus Spring. 2 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent. Lecs, T R 10:10. A. P. Bretscher. Lectures covering current topics in cell biology, including a detailed discussion of secretion, endocytosis, membrane-bound organelles, membrane recycling, the cytoskeleton, cell motility functions, cell cycle, and related topics. Together with Biological Sciences 632 and 639, this course provides broad coverage of the cell biology subject area.

637 Integration and Coordination of Energy Metabolism (also Nutritional Sciences 636) Fall. 3 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent. Lecs, M W F 9:05. Evening prelms to be arranged. W. J. Anon. The elements and dynamics of energy metabolism in higher animals are developed systematically through biochemical characterizations of the metabolic components and structure of major tissues and organs. Emphasis is placed on correlations with physiologic functions. Mechanisms that control energy metabolism within individual tissues and coordinate these processes in intact animals are analyzed in the contexts of selected physiologic and pathologic stresses.

638 Intermediate Biochemical Methods Fall or spring. 4 credits. Primarily for graduate students minoring in biochemistry and undergraduates concentrating in biochemistry. Enrollment limited to 24 students in the fall and 48 students in the spring. Admission to the course is dependent upon the results of a personal interview with the instructor, which must be held before the first day of classes. There is no admission to the course without the interview. Undergraduates are urged to interview during preregistration. May not be taken for credit after Biological Sciences 430.

Lab, T R 9:05–4:25 (fall); lab, T or R 9:05–4:25 (spring). D. B. Wilson, J. E. Blankenship, and staff. Selected experiments on proteins, enzymes, DNA, and biochemical properties of biological systems. The course emphasizes qualitative aspects and techniques currently used in biochemical research.

639 Molecular Biology of the Cell: Inside the Nucleus Spring. 2 credits. Prerequisite: Biological Sciences 330 or 331 or equivalent. Recommended: Biological Sciences 281.

Lec, M 8–9:55 p.m. J. T. Lis. Lectures on topics of eucaryotic gene organization, regulation of gene expression, RNA processing, chromatin structure, the structure and movement of chromosomes, and the architecture of the nucleus. This course and Biological Sciences 632 and 639 provide broad coverage of the cell biology subject area.

648 Plant Biochemistry Spring. 3 credits. Prerequisites: organic chemistry, biochemistry, and a course in plant physiology. Offered alternate years. Not offered 1987–88. Lecs, M W F 9:05. A. T. Jagendorf, R. E. McCarty, J. F. Thompson. Selected aspects of plant biochemistry are reviewed in the context of the plant life cycle and responses to the environment. Topics include metabolism of lipids, carbohydrates, organic acids, and proteins; nitrogen and sulfur assimilation; respiration; photosynthesis; development and replication of chloroplasts; and cell-wall composition and properties. Attention is paid to operation of control mechanisms.

650 Nitrogen Metabolism (also Nutritional Sciences 607) Spring. 2 credits. Prerequisites: Biological Sciences 330 or 331 and Chemistry 358 or 360. Offered alternate years. Not offered 1987–88. Lecs, T R 9:05. M. Watford. A coverage of most aspects of nitrogen metabolism. The first section of the course deals with nitrogen fixation and assimilation, and the metabolism and biological importance of purines, pyrimidines, porphyrins, alkaloids, and amides. This is followed by discussion of the pathways of amino acid biosynthesis and degradation. The final section includes discussion of protein turnover and degradation, nitrogen excretion, and interorgan relationships in higher organisms. Emphasis throughout the course is on hormonal, developmental, and molecular biological aspects of metabolic regulation and evolutionary differences.

659 Risk Management of Toxic Chemicals (also Biology and Society 459 and Toxicology 659) Fall. 2 or 3 credits (3 credits with major research paper). Prerequisite: concurrent registration in Toxicology 610 or permission of instructor. Limited to 12 students. S-U grades only. Offered alternate years. Not offered 1987–88. Sem, T 2:30–4:25. J. M. Fessenden-Raden. Selected cases of chemical risk communication and risk management by government agencies, communication, industry, and individuals are reviewed. Potential topics include toxic wastes, groundwater contamination, chemical accidents, and occupational and community right-to-know. The roles of social, economic, political, legal, and ethical factors in decision making are discussed. Readings from the various disciplines, as well as scientific reports, provide background for class discussions.

731–736 Current Topics in Biochemistry Fall or spring. ½ or 1 credit for each topic. May be repeated for credit. (Students registering for ½ credit should not fill in the credit-hour column on the optional-mark registration form; the computer is programmed to register students automatically for ½ credit.) Prerequisite: Biological Sciences 330 or 331 or equivalent. S-U grades only. Lectures and seminars on specialized topics. Fall 1987. Three topics are offered.


751 Professional Responsibilities of Toxicologists (also Toxicology 751) Fall. 2 credits. Prerequisites: advanced graduate standing and permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88. Not offered 1985–86. Sem, T 2:30–4:25. J. M. Fessenden-Raden. Case studies of professional responsibilities and dilemmas faced by toxicologists in academia, industry, and government, with discussions of possible approaches, alternatives, and outcomes. Readings of scientific, ethical, and general papers provide background for discussions. Topics for consideration include legal liabilities, chemical-safety issues, data presentation and participation, communicating with the public, conflicts of interest/commitment, peer review, and professional codes of ethics.

752 Isotope Kinetics (also Nutritional Sciences 682) Spring. 2 credits. Prerequisite: calculus. S-U grades only. Offered alternate years. Not offered 1987–88.

Sem, T 7:30–9:30 p.m. D. B. Zivins. Quantitative analysis of the transport and distribution of nutrients, metabolites, and drugs in multicompartamental systems. The material is presented as lectures, discussion groups, and problem sets.

830 Biochemistry Seminar Fall or spring. No credit.

Sem, F 4:30. Staff. Lectures on current research in biochemistry, presented by distinguished visitors and staff members.

831 Advanced Biochemical Methods I Fall. 6 credits. Limited to graduate students majoring in biochemistry. Labs and discs. 12 hours each week to be arranged. Organizational meeting first R of semester at 10:10. D. B. Wilson, J. E. Blankenship. To learn the basic techniques of biochemical research, each student performs experiments on proteins, enzymes, DNA, and bioenergetics.

832 Advanced Biochemical Methods II Spring. 6 credits. Limited to graduate students majoring in biochemistry. S-U grades only. Lab to be arranged. Staff (coordinator: graduate field representative). Research in the laboratories of two or three different professors chosen by the student. Arrangements are made jointly between the graduate field representative and the research adviser.

833 Research Seminar in Biochemistry Fall and spring. 1 credit each term. Students must register for 2 credits each term, since an "R" grade is given at the end of the fall term. May be repeated for credit. Required of and limited to, second-, third-, and fourth-year graduate students majoring in biochemistry. S-U grades only.

Sem, T 5–6; 30, 1, V. M. Vogl.

Each student presents one seminar per year on his or her thesis research and then meets with instructors and thesis committee members for evaluation.

Related Courses in Other Departments

Lipids (Biological Sciences 619 and Nutritional Sciences 602)

Molecular Aspects of Development (Biological Sciences 483)
Molecular Mechanisms of Hormone Action
(Biological Sciences 658 and Veterinary Medicine 758)

Teaching Experience (Biological Sciences 498)

Undergraduate Research in Biology (Biological Sciences 499)

Botany

241 Introductory Botany Fall. 4 credits. Enrollment may be limited, with preference given to sophomores and juniors majoring in agronomy, botany, environmental education, floriculture, horticulture, natural resources, plant sciences, vegetable crops, and wildlife. Prerequisite: one year of introductory biology or permission of instructor.

Lecs, M W F 9:05, lab, M T W R or F 1:25-4:25, or M or W 7:30-10:30 p.m. K. J. Niklas.

Introductory botany for those who plan to specialize in, or use some aspect of, the plant sciences. Emphasizes structure, reproduction, and classification of angiosperms and the history of life on earth. Laboratory emphasizes development of skills in handling plant materials, including identification. First and second weeks of laboratory are field trips, starting with the first day of classes. Those who register for an evening laboratory are still required to attend the afternoon field trips.

242 Plant Physiology, Lectures Spring. 3 credits. Primarily for undergraduates in agricultural sciences. Prerequisites: one year of introductory biology and introductory chemistry. Concurrent enrollment in Biological Sciences 244 required of undergraduates. May not be taken for credit after Biological Sciences 341 except by permission of instructor.


Plant physiology as applied to plants growing in communities. Examples deal with crop plants or higher plants where possible, though not exclusively. Topics include cell structure and function; plant metabolism, including photosynthesis; light relations in crops; plant-water relations; water uptake, transport, and transpiration; development of sugar transport; mineral nutrition of crops; growth and development—hormones, flowering, fruiting, dormancy, and abscission; stress.

244 Plant Physiology, Laboratory Spring. 2 credits. Prerequisite: concurrent enrollment in Biological Sciences 242. May not be taken for credit after Biological Sciences 349.

Disc and lab, M T W or R 12:20-4:25. C. Reiss.

Experiments exemplify concepts covered in Biological Sciences 242 and offer experience in a variety of biological and biochemical techniques, including use of small amounts of radiotopes.

246 Plants and Civilization Spring. 3 credits. Lecs, T R 11:15, disc, 1 hour each week to be arranged. D. M. Bates.

A consideration of the role of plants in the development and future of civilization. Emphasis is on the interactions between humans and the plant environment, and the manner in which humans use and integrate into their cultures the rich array of plants populating the earth.

248 (343) Taxonomy of Vascular Plants Spring. 4 credits. Prerequisites: one year of introductory biology and written permission of instructor. May not be taken for credit after Biological Sciences 342.


An introduction to the classification of vascular plants, with attention to principles, methods of identification, and literature. Field trips are held during laboratory periods in the first half of the term.

341 Plant Physiology, Lectures Fall. 3 credits. Prerequisites: one year of introductory biology, organic chemistry, and either concurrent enrollment in Biological Sciences 349 or written permission of instructor. May not be taken for credit after Biological Sciences 242 (unless written permission is obtained from instructor). Lecs, T R 10:10 and M 7:30 p.m. A. J. Jagendorf.

The behavior, growth, transport processes, and environmental response of plants. Topics include membrane properties, solute and water transport, and function of osmotic forces; mineral and organic nutrition; stress resistance; growth and development controls; metabolism, including photosynthesis and respiration; and responses to environmental influences.

343 Taxonomy of Cultivated Plants (also Floriculture and Ornamental Horticulture 342) Spring. 4 credits. Prerequisite: one year of introductory biology or written permission of instructor. May not be taken for credit after Biological Sciences 248 (343). Not offered 1987-88.

Lecs, M W 10:10, labs, M W 2-4:25. Staff.

A study of ferns and seed plants, their relationships, and their classification into families and genera. Emphasizing cultivated plants. Particular emphasis is placed on gaining skills in identifying and distinguishing families and in preparing and using analytic keys. Attention is also given to the economic importance of taxa, to the basic taxonomic literature, and to the elements of nomenclature.

345 Plant Anatomy Fall. 4 credits. Limited to 48 students. Prerequisite: one year of introductory biology or a semester of botanical illustration.


A descriptive course with equal emphasis on development and mature structure. Lecture, laboratory, and reading are integrated in a study guide. The laboratory offers the opportunity to develop the practical skills required to make anatomical diagnoses and to write anatomical descriptions.

346 Algal Physiology Fall. 3 credits. Prerequisites: one year of introductory biology for majors and Biological Sciences 242 or 341, or permission of instructor. S-U grades optional. Offered alternate years.

Lecs, T R 8:30-9:55. T. G. Owens.

A brief description of the algal classes, as well as classical and emerging criteria for taxonomic classification. Discussions include the interactions of algae with their physical and chemical environments, uptake of inorganic compounds, algal photosynthesis, and metabolic strategies of unicellular and macrophytic algae. Emphasis is placed upon physiological comparisons between algae and higher plants.

349 Plant Physiology, Laboratory Fall. 2 credits. Prerequisite: concurrent enrollment in Biological Sciences 341. May not be taken for credit after Biological Sciences 244.

Lab, W or R 1:25-4:25; disc, W or R 12:20. Lab and disc must be on same day. C. Reiss.

Experiments exemplify concepts covered in Biological Sciences 341 and offer experience in a variety of biological and biochemical techniques, including use of small amounts of radiotopes.

359 Biology of Grasses Fall. 3 credits. Limited to 24 students. Prerequisite: one year of introductory biology or an introductory plant taxonomy course, or permission of instructor. S-U grades optional. Offered alternate years.

Lecs, T R 10:10; lab, T 1:25-4:25. J. J. Davis.

Systematics and ecology of the graminoid plant families (grasses, sedges, and rushes), with principal emphasis on grasses. Major topics include taxonomy, phyleogenetics, physiology, reproduction biology, ecotypic variation, speciation, biogeography, and population biology. The role of graminoids as ecosystem dominants, weeds, and the origins of cultivated species are discussed.

440 Plant Geography Spring. 2 credits. Prerequisite: Biological Sciences 248 (343) or equivalent. Recommended: Biological Sciences 378 or 463 or both. S-U grades optional, with permission of instructor. Offered alternate years. Not offered 1987-88.


An integrated study of the systematics and evolution of agronomic and horticultural species. Processes of domestication, the evolutionary history of selected cultivated plants, weeds and land races, classification and nomenclature as applied to cultivated plants, and underexploited plant resources are among the topics considered.

442 Biology of Plant Species Spring. 2 credits. Prerequisite: Biological Sciences 248 (343) or equivalent. Recommended: Biological Sciences 378 and 463. S-U grades optional, with permission of instructor. Offered alternate years. Not offered 1987-88.

Lecs, T R 10:10. Staff.

A comprehensive introduction to the nature and origin of plant species, with particular focus on evolutionary genetics, race formation and modes of speciation, evolution of reproductive isolating mechanisms, types of species complexes found in plants, cytogenetic aspects of plant speciation, natural hybridization and its consequences, and the origin and nature of higher taxa.

443 Research Methods in Systematic Botany Fall. 2 credits. Limited to 10 students. Prerequisite: Biological Sciences 248 (343) or equivalent. Offered alternate years. Not offered 1987-88.

Lab, F 1:25-4:25, additional hours to be arranged. Bailey Hortorium staff.

An introduction to the methodology of plant systematic research: field studies; sampling and collecting methods; preparation of taxonomic revisions and manuscripts; numerical methods in systematics; and laboratory methods in cytogenetics, comparative anatomy, and comparative chemistry, as applied to problems in plant systematics.

445 Photosynthesis (also Applied and Engineering Physics 601) Fall. 3 credits. Prerequisites: Chemistry 104 or 208, Mathematics 105 or 111, and either Physics 102 or 208, or permission of instructor. Offered alternate years. Not offered 1987-88.

Lecs, M W F 10:10. T. G. Owens.

A detailed study of the process by which plants use light in order to grow; physical and physicochemical aspects of the process are emphasized.

447 Molecular Plant Systematics Fall. 3 credits. Prerequisites: Biological Sciences 281, 330 or 331, and 248 (343), or written permission of instructor. Offered alternate years.


The study of variation at the molecular level and its application to the taxonomy and evolution of plants, primarily angiosperms. Both micromolecules—particularly flavonoids—and macromolecules are discussed. Topics include cytological and molecular variation of proteins, the use of such variation as a phylogenetic tool, and genome organization and evolution. Major emphasis is placed on the impact of recombinant DNA technology on plant systematics, with comprehensive treatment of the methods involved. The nuclear, chloroplast, and mitochondrial genomes of plants are treated in detail.
with discussion of the use of variation patterns discernible at the restriction-enzyme and DNA sequencing levels. Methods of phylogenetic analysis of molecular data are also covered.

448 Plant Evolution and the Fossil Record
Spring. 3 credits. Prerequisites: Biological Sciences 241 or equivalent, and permission of instructor. Offered alternate years.

Lecs, T R 9:05; lab, R 12:20–2:15. K. J. Niklas. An introduction to evolution, surveying major changes in plants from the origin of the life to the present. Emphasis is placed on plant form and function, adaptations to particular ecologic settings, and evolutionary theory as it relates to plants.

[640 Applied Plant Anatomy
Spring. 3 credits. Prerequisites: Biological Sciences 345 or equivalent, and permission of instructor. Not offered 1987–88. Lecs and disc, T R 9:05; lab, W 10:10–1:10 or by arrangement with instructor. N. W. Uhlig. The use of anatomy in vascular plants for diagnosis of structure, taxonomy, relationships, evolutionary sequences, and ecologic adaptations, with emphasis on recent research. The laboratory provides experience in techniques and interpretation.]

641 Laboratory in Plant Molecular Biology
Fall. 4 credits. Prerequisites: Biological Sciences 281 or equivalent, 330 or 331 or equivalent, and permission of instructor. S-U grades only. Lab to be arranged. J. B. Nasrallah, M. R. Hanson, S. D. Tanksley, P. Palukaitis. Selected experiments on genome organization, gene expression, and gene transfer in plants. The course emphasizes the application of molecular biology methodology to plant systems.

[642 Plant Mineral Nutrition
Spring. 3 credits. Prerequisites: Biological Sciences 341 or equivalent. Offered alternate years. Not offered 1987–88. Lecs, M W F 10:10. L. V. Kochian, R. M. Welch. A detailed study of the processes by which plants acquire and use nutrients from the soil. Topics include the uptake, translocation, and compartmentation of mineral elements; root-soil interactions; the metabolism of mineral elements; the involvement of mineral nutrients in various physiological processes; and the nutrition of plants adapted to extreme environmental stresses (e.g., salinity). Specific mineral elements are emphasized to illustrate these topics.]

643 Plant Physiology, Advanced Laboratory Techniques
Fall. 4 credits. Primarily for graduate students in the plant sciences. Prerequisites: organic chemistry, biochemistry, and a course in plant physiology. S-U grades only. Lab, T or W 8–5; disc, M 4:30–5:30. Staff. An introduction to some modern methods in experimental plant biology.

644 Plant Growth and Development
Spring. 3 credits. Prerequisites: Biological Sciences 345 and either 242 or 341 or their equivalents, or written permission of instructor. Offered alternate years. Lecs, M W F 9:05. P. J. Davies, D. J. Paolillo. Explores the changes that occur during plant growth and development and their control: morphological and anatomical changes in apices, tissue differentiation, organ formation, embryo development, gene regulation, hormone action and interaction, the influence of light in development, flowering, rooting, dormancy, abscission, and senescence.

[645 Families of Tropical Flowering Plants
Fall. 1 credit. Prerequisites: written permission of instructor or S-U grades only. Offered alternate years. Not offered 1987–88. Lecs and disc, F 11: 15. D. A. Young. The families of flowering plants encountered solely or chiefly in tropical regions are considered in lectures, discussions, and demonstrations, with the aim of providing basic points of recognition for, and an understanding of relationships in these families for the student venturing into the tropics.]

[646 Families of Tropical Flowering Plants: Field Laboratory
Spring. 2 credits. Limited to 20 students, with preference given to graduate students from member institutions of the Organization for Tropical Studies. Prerequisite: Biological Sciences 342 or 248 (343) or equivalent. Recommended: Biological Sciences 645. S-U grades only. For more details on i and application, contact the L. H. Bailey Hortorium, 467 Mann Library. Offered alternate years. Not offered 1987–88. Bailey Hortorium staff. An intensive orientation to families of tropical flowering plants represented in forests of the American tropics. Emphasis on field identification combined with laboratory analysis of available materials in a "whole-ecology" context.]

647 Seminar in Systematic Botany
Fall or spring. 1 credit. Prerequisite: written permission of course coordinator required for undergraduates. S-U grades only. Sem, W 2:30–4:30. Staff. Lectures and discussions led by staff, visitors, and students on topics of current importance to systematic botany.

648 Plant Biochemistry
Spring. 3 credits. Prerequisites: organic chemistry, biochemistry, and a course in plant physiology. Offered alternate years. Not offered 1987–88. Lecs, M W F 9:05. A. T. Jagendorf, R. E. McCarty, J. F. Thompson. Selected areas of plant biochemistry are reviewed in the context of the plant life cycle and responses to the environment. Topics include metabolism of lipids, carbohydrates, organic acids, proteins, nitrogen and sulfur assimilation; respiration, photosynthesis; development and replication of chloroplasts; and cell-wall composition and properties. Attention is paid to operation of control mechanisms.

649 Transport of Solutes and Water in Plants
Fall. 3 credits. Prerequisite: Biological Sciences 341 or equivalent. Offered alternate years. Lecs, M W F 10:10. R. M. Spanoewick. Transport of ions, water, and organic materials in plants; mechanisms of ion transport; relationships between ion transport and metabolism; ion uptake and transport in higher plants; phloem transport; and water relations of single cells and whole plants.

[651 Quantitative Whole-Plant Physiology
Fall. 3 credits. Prerequisites: introductory physics, calculus, and plant physiology. S-U grades only. Offered alternate years. Not offered 1987–88. Lecs, T R 10:10–11:30. R. M. Spanoewick. An exploration of the context of which physiological processes and their interactions can be formulated in a quantitative manner and integrated to describe various aspects of plant behavior, including growth and yield. Consideration is given to characterization of the plant environment, energy balance, gas exchange, water relations, photosynthesis, respiration, translocation, nutrient supply, and the timing of developmental events.]

653 Plant Molecular Genetics (also Plant Breeding 653)
Spring. 3 credits. Prerequisites: Biological Sciences 281, 330 or 331 or their equivalents. Offered alternate years. Lecs, T R 10:10–11:30. S. D. Tanksley, M. R. Hanson, J. B. Nasrallah. A review of the organization, function, and evolution of genetic information in higher plants. An in-depth treatment of the organization of the chloroplast, mitochondrial, and nuclear genomes as well as their interactions. Current information on gene regulation in higher plants is also discussed.

654 Plant Nomenclature

655 Topics in Paleobotany
Spring. 1 credit. Prerequisite: written permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88. Lec and disc, R 10:10. J. W. Ingram. A survey of the basic reference works in taxonomy from the pre-Linnæan literature drawn on by Linnaeus to contemporary publications, with comments on the peculiarities of the books (when appropriate), publication dates, typographic devices, and intricacies of bibliographic citation.

740 Plant Biology Seminar
Fall and spring. No credit (no official registration). Required of graduate students doing work in plant biology. Sem, F 11:15. Staff. Lectures on current research in plant biology, presented by visitors and staff.

742 Current Topics in Plant Molecular Biology
Spring. 1 credit. Limited to 20 students. Primarily for graduate students, with preference given to majors or minors in plant molecular biology; written permission of instructor required for undergraduates. S-U grades only. Sem, 1 hour each week to be arranged. Staff. A seminar with critical presentation and discussion by students of original research papers concerning the molecular biology of plants. Staff direction varies each year and is announced a semester in advance.

749 Graduate Research in Botany
Fall or spring. Variable credit. May be repeated for credit. S-U grades optional. Hours to be arranged. Staff. Similar to Biological Sciences 498 but intended for graduate students who are working with faculty members on an individual basis.

840 Current Topics in Plant Physiology
Fall or spring. 2 credits. May be repeated for credit. S-U grades only. Sem to be arranged. Staff. Seminar reports by graduate students on current literature in experimental plant physiology or related areas.

Related Courses in Other Departments
Marine Botany: Ecology of Marine Plants (Biological Sciences 449) Introductory Mycology (Plant Pathology 309) Mycology (Plant Pathology 705) Mycology Conferences (Plant Pathology 649) Plant Ecology, Lectures and Laboratory (Biological Sciences 463 and 465) Plant Ecology Seminar (Biological Sciences 669) Taxonomy of Fungi (Plant Pathology 729) Teaching Experience (Biological Sciences 498) Undergraduate Research in Biology (Biological Sciences 499)
Ecology, Systematics, and Evolution

261 General Ecology Fall or summer. 3 credits. For students concentrating in ecology or a related subject. Not open to freshmen. Prerequisite: one year of introductory biology. May not be taken for credit after Biological Sciences 262.
Lecs, T R 9:05; disc, W or R 1:25, 2:30, or 3:35. P. P. Feeny and staff.
Principles concerning the interactions between organisms and their environment, influence of competition, predation, and other factors on population size and dispersion; analysis of population structure and growth; evolution, interspecific competition and the niche concept, succession and community concepts; influence of climate and past events on the diversity and stability of communities in different environments. Evolutionary theory is examined throughout, and attention is given to conflicting ecological hypotheses.

262 Ecology, Environment, and Society Spring. 3 credits. Prerequisite: one year of introductory biology or written permission of instructor. Not open to freshmen. Prerequisite: one year of credit after Biological Sciences 261.
An introduction to ecology emphasizing basic principles and their application to current environmental problems. The course deals with both terrestrial and aquatic ecology, including phenomena that occur at the population, community, and ecosystem levels of organization. The interactions of people with ecosystems are considered, with particular emphasis on agriculture and world hunger, energy and resource use, pollution, and the conservation of species and habitats.

263 Field Ecology Fall. 2 credits. Prerequisite: concurrent or previous enrollment in Biological Sciences 274. Lecs, R 1:25; lab, F 12:20-5. P. L. Marks, R. B. Root.
Field exercises designed to give students direct experience with field work, with an emphasis on developing observational skills and a landscape perspective. Topics include, niche relationships of insects, influence of herbivores and competition on plant performance, decomposition of soil litter, sampling plankton, and use of scientific collections.

274 The Vertebrates Spring. 5 credits. Primarily for sophomores; a prerequisite or recommended course for many advanced courses in vertebrate biology, anatomy, and physiology. Each lab limited to 21 students. Prerequisite: one year of introductory biology for majors. Fee, $10.
Lecs, T 10:10; labs, M W F 1:25–5 or 7–10 p.m., or T R 1:25–5. Evening prelim. Mar. 15, 3 evening labs practical to be arranged. F. H. Rough and staff. An introduction to the evolution, classification, comparative anatomy, life history, and behavior of vertebrate animals. Laboratory dissection and demonstration are concerned with structure, classification, systematics, biology of species, and studies of selected aspects of vertebrate life.

An introduction to the biology of Homo sapiens through an examination of human evolution, biological diversity, and adaptation to and interactions with environments. Evolutionary theory is reviewed in relation to the current evidence from the fossil record and studies of the evolution of human behavior. A survey of human adaptations of biological and behavioral responses to environmental stress. Human diversity is examined as the product of long-term evolutionary forces and short-term adaptive responses. Topics such as creationism, the Piltdown fraud, the sociobiology debate, genetic engineering, race and IQ, and racism are presented as examples of current issues in human biology. These topics and others are the focus of the optional one-hour weekly discussions.

Lecs, M W F 10:10; W. N. McFarland and staff.
An introductory course for students interested in ecology and physiology. The characteristics of the physical environment and how factors related to organisms are discussed, and representative physiological, behavioral, and morphological adaptations of vertebrate and invertebrate animals to their environments are analyzed.

Lab, W or R 1:25–4:25; W. N. McFarland.
Exercises involving measurement of important environmental factors in local habitats, and laboratory experiments to familiarize students with the use of ecophysiological concepts.

371 Human Paleontology Fall. 4 credits. Prerequisite: one year of introductory biology or Anthropology 214 or permission of instructor. Offered alternate years.
Lecs, M W F 2:30; lab, 1 hour each week to be arranged; occasional field trips. K. A. R. Kennedy.
A broad survey of the fossil evidence for human evolution with special attention to skeletal and dental anatomy, geology, paleoecology, dating methods, archaeological associations, and current theories of primate phylogeny.

373 The Invertebrates: Form, Function, and Evolution Fall. 4 credits. Limited to 30 students. Prerequisite: one year of introductory biology for majors.
An introduction to the evolution of form and function among the major invertebrate phyla. Strong emphasis is placed on the integration of evolutionary past and ecological present to produce extant forms. Lectures draw heavily on original literature from the field of invertebrate functional morphology. Laboratory dissections and demonstrations often involve live marine and freshwater invertebrates.

378 Organic Evolution Spring. 4 credits. Prerequisite: one year of introductory biology or permission of instructor. S-U grades optional.
Lecs and demonstrations, M W F 10:10; disc, 1 hour each week to be arranged. R. G. Harrison.
The course considers explanations for patterns of diversity and for the apparent "good fit" of organisms to the environment. Topics covered include the genetic and developmental basis of evolutionary change, processes at the population level, the theory of evolution by natural selection, levels of selection, concepts of fitness and adaptation, modes of specialization, long-term trends in evolution, rates of evolution, and extinction.

455 Insect Ecology (also Entomology 455) Fall. 3 credits. Prerequisite: Biological Sciences 261 and Entomology 212 or their equivalents. Offered alternate years.
Lecs, W F 11:15; disc, 1 hour each week to be arranged. R. B. Root.
Ecological and evolutionary principles are integrated by thorough examination of outstanding investigations. Topics discussed include the factors responsible for the great diversity of insects, adaptive syndromes associated with climate, natural history of arthropod guilds, impact of insects on terrestrial vegetation, population regulation, and the contrast between natural and managed ecosystems.

462 Limnology, Lectures Fall. 3 credits. Prerequisite: Biological Sciences 261 or 262 or written permission of instructor. Offered alternate years.
Lecs, M W F 11:15. N. G. Hais rton, Jr.
The study of continental waters, with emphasis on lakes and ponds. Factors controlling nutrient and community dynamics of freshwater organisms, and physical and chemical properties of fresh water are considered.

463 Plant Ecology, Lectures Fall. 3 credits. Prerequisite: two advanced-level courses in biology, including Biological Sciences 261, or permission of instructor. Recommended: Some taxonomic familiarity with vascular plants and concurrent enrollment in Biological Sciences 465.
Principles of plant-environment and plant-plant interactions in relation to the evolution, distribution, structure, and functioning of plants and plant communities.

464 Limnology, Laboratory Fall. 2 credits. Prerequisite: concurrent or previous enrollment in Biological Sciences 462.
Lab, T R 10:15, 1 weekend field trip. N. G. Hais rton, Jr. and staff.
Laboratories and field trips devoted to studies of the biological, chemical, and physical properties of lakes and other freshwater environments.

465 Plant Ecology, Laboratory Fall. 1 credit. Prerequisite: concurrent enrollment in Biological Sciences 463.
Laboratory and field exercises designed to give firsthand experience with the ecology of plants. Emphasis is on making observations and measurements in the field.

471 Mammalogy Fall. 4 credits. Recommended: Biological Sciences 274. S-U grades optional, with permission of instructor. Offered alternate years. Fee, $15.
Lecs, M W F 9:05; lab, M or T 1:25–4:25; 1 weekend field trip required. Staff.
Lectures on the evolution, classification, distribution, and adaptations of mammals. Laboratory and fieldwork on systematics, ecology, and natural history of mammals of the world, with primary emphasis on the North American fauna. Field laboratories held in the museum at Research Park.

473 Herpetology Fall. 4 credits. Recommended: Biological Sciences 274. S-U grades optional, with permission of instructor. Offered alternate years. Fee, $10.
Lecs and labs, T R 12:20–4:25; occasional field trips and special projects. J. H. Rugh.
Lectures cover various aspects of the biology of amphibians and reptiles, including evolution, zoogeography, ecology, behavior, and physiology. Laboratory includes systematics, functional morphology, and behavior.

[474] Laboratory and Field Methods in Human Biology Spring. 4 credits. Prerequisite: one year of introductory biology or Anthropology 214 or permission of instructor. Offered alternate years. Not offered 1987–88. Next offered 1988–89.
Lecs and labs, T R 10:10–12:05, additional hours to be arranged. R. E. Karge, R. E. Kennedy.
Practical exercises and demonstrations of modern approaches to the methodology of physical anthropology. Emphasis on comparative human anatomy, the human paleontological record, description of skeletal and living subjects, paleopathology, skeletal maturation, and relevant field techniques for the archaeologist and forensic anthropologist.
[747] Ornithology Fall or summer. 4 credits. Recommended: Biological Sciences 274. S-U grades optional, with permission of instructor. Limited to 30 students. Offered alternate years. Not offered 1987–88. Fee, $15.
Lecs and labs, T R 12:20–4:25, occasional field trips and special projects. T. J. Cade.
Lectures cover various aspects of the biology of birds, including anatomy, physiology, classification, evolution, migration, and behavior. Lectures are fully integrated with laboratory studies. Laboratory includes studies of morphology, plumages, and specimens of avian families of the world and species of New York. Independent projects emphasize field identification and research skills.

[748] Biology of Fishes Fall. 4 credits. Prerequisite: Biological Sciences 274 or equivalent experience in vertebrates 261 or 262 with written course or permission of instructor. Offered alternate years. Not offered 1987–88.
An introduction to the study of fishes: their structure, evolution, distribution, ecology, physiology, behavior, classification, and identification, with emphasis on local species.

[749] Paleobiology (also Geological Sciences 479) Fall. 3 credits. Prerequisites: one year of introductory biology for majors and either Biological Sciences 274 or Geological Sciences 375, a course in invertebrate zoology, or permission of instructor. Offered alternate years. Not offered 1987–88.
A survey of the major courses of organisms and their evolutionary histories. Intended to fill out the biological backgrounds of geology students and the geology backgrounds of biology students concerning the nature and significance of the fossil record for their respective studies.

660 Field Studies in Ecology and Systematics Spring. Variable credit. Prerequisites: Biological Sciences 261 or 262. Credits for the major course of organisms and their evolutionary histories. Estimated cost of room and board (exclusive of transportation) to be arranged. Lecs and labs to be arranged. P. L. Marks.
This course provides students an opportunity to learn new techniques and participate in an intensive series of field exercises. An extended field trip is scheduled during either intersession or spring break. The region visited, trip objectives, and other details are arranged by the instructor in charge of the division's catalog supplement issued at the beginning of the semester. Meetings on campus are devoted to orientation and reports on completed projects.

661 Environmental Policy (also Biology and Society 461) Fall and spring. 2 or 3 credits each term. Limited to 12 students. Prerequisite: permission of instructor. S. A. Levin.
R, T 7:30–9:30 p.m. D. Pimentel.
This course uses an interdisciplinary approach to focus on complex environmental and energy problems. Ten to twelve students, representing several disciplines, investigate significant environmental problems. The research team spends two semesters preparing a scientific report for publication in Science or BioScience.

662 Mathematical Ecology (also Statistics and Biometry 662) Spring. 3 credits. Prerequisites: one year of calculus and a course in statistics. Recommended: a general ecology course. S-U grades optional, with permission of instructor. Offered alternate years. Not offered 1987–88.

Sem, 1 evening each week to be arranged. P. P. Feeny.
Prescribes full and discussions by students on the evolution of patterns of interaction between plants and insects, emphasizing critical evaluation of concepts and evidence.

Sem to be arranged. N. G. Hairston, Jr.
A seminar course on advanced limnological topics.

667 Topics in Theoretical Ecology Fall. 3 credits. Primarily for graduate students; permission of instructor required for undergraduates. Prerequisite: one year of calculus. Recommended: Biological Sciences 662. S-U grades optional. Offered alternate years.
Lecs, 3 hours each week to be arranged. S. A. Levin.
Current and classical theoretical issues in ecology and evolutionary biology. Biological issues are emphasized, although mathematical models are used throughout as tools to address those issues. Lectures cover both standard material and current journal articles.

669 Plant Ecology Seminar Spring. 1 credit. May be repeated for credit. Suggested for students majoring in or minoring in plant ecology. S-U grades optional. Sem to be arranged. Staff.
Includes review of current literature, student research, and selected topics of interest to participants.

670 Graduate Seminar in Vertebrate Biology Fall or spring. 1 credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades only. Sem to be arranged. Staff.
Seminar presentations and discussions by students on areas of current research in vertebrate biology. Topics vary from semester to semester.

Sem, M 7:30–9:30 p.m.; additional hours to be arranged. K. A. R. Kennedy.
The historical background of present-day concepts of man's evolutionary variations and adaptations in space and time is surveyed. The formation of biological anthropology as an area of scientific inquiry within the social and biological sciences is reviewed.

674 Principles of Systematics (also Entomology 674) Spring. 4 credits. Limited to 15 students. Prerequisite: permission of instructor. Recommended: an introductory biological systematics course. Offered alternate years.
Lecs, discs, and labs, M W T 1:25–4:25. Q. D. Wheeler and staff.
An introduction to modern theory and methods of systematic biology. Lectures are on theoretical systematics and include species concepts, classification, phylogenetics, and biogeography. Laboratories include modern methods of analysis of data, including cladistic hand and computer methods and numerical approaches. Laboratory grade is based in part on a final paper.

760 Special Topics in Evolution and Ecology Fall or spring. 1–3 credits. May be repeated for credit. Enrollment limited. S-U grades optional, with permission of instructor.
Hours to be arranged. Staff.
821 Genetics Fall or spring. 5 credits. Not open to freshmen in fall semester. Enrollment may be limited to 200 students. Prerequisite: one year of introductory biology or equivalent. Students who have taken Biological Sciences 282 may register only with written permission of instructor. No admittance after first week of class unless special permission is obtained from the instructor. Lecs., T R 10-12; 12:30-2; 2:30-4; or 5-7, additional hours to be arranged. Labs may also be scheduled T R 8-9:55, W or F 10-12; 12:30-2; or 3:30-5; or 5-7. Students do not choose lab sections during course enrollment; lab assignments are made during first day of classes. P. J. Bruns, T. D. Fox, M. L. Goldberg, R. J. MacIntyre.

A general study of the fundamental principles of genetics in eukaryotes and prokaryotes. Discussions of gene transmission, gene action and interaction, gene linkage and recombination, gene structure, gene and chromosome mutations, genetic aspects of differentiation, genes in populations, breeding systems, and extrachromosomal inheritance. Aspects of recombinant DNA technology are discussed. The laboratory students perform experiments with microorganisms and conduct an independent study in laboratory exercises in Drosophila.

282 Human Genetics Spring. 2 or 3 credits (2 credits if taken after Biological Sciences 281). Each disc limited to 25 students. Prerequisite: one year of introductory biology or equivalent; written permission of instructor required. Students who have taken Biological Sciences 281.

Lecs., M W 10:10; disc, R or F 10:10 or 11:15. Staff. An introduction to human heredity through consideration of aspects of human genetics that influence our understanding of ourselves and on our potential for influencing our present and future well-being. The course is intended primarily to contribute to the student's general education in these matters. Although certain aspects of genetics are considered with some rigor, the course is not designed to serve as a prerequisite to advanced courses in genetics.

385 Developmental Biology Fall. 3 credits. Prerequisite: Biological Sciences 281.

Lecs., M W F 11-1, K. J. Kephues. An introduction to the morphogenetic, cellular, and genetic aspects of the developmental biology of animals.

386 Embryology Spring. 4 credits. Prerequisites: one year of introductory biology and a knowledge of mammalian adult anatomy. Limited to seniors. Lecs., T R 10-10; labs, T R 2-4.25. A. W. Blackler. A course in the embryonic development of vertebrate animals, with emphasis on the comparative aspects of morphogenesis and function at the tissue level. The laboratory has a strong morphogenetic bias, emphasizing the comparative aspects of developmental anatomy.

480 Seminar in Developmental Biology Spring. 1 credit. May be repeated. Limited to upperclass students. S-U grades only. Sem to be arranged. Staff.

481 Population Genetics Fall. 4 credits. Prerequisite: Biological Sciences 281 or equivalent. Lecs., M W F 10-10; disc, 1 hour each week to be arranged. C. F. Aquadro.

A study of factors that influence the genetic structure of Mendelian populations and that are involved in race formation and speciation. Topics include the diversity and measurement of genetic variation, mating and reproductive behavior, gene flow and selection and fitness, genetic drift, migration and population structure, mutation, multilocus models, the genetics of speciation, quantitative traits, and the maintenance of molecular variation. The interplay between theory and the data from experiments and natural populations are emphasized.

482 Human Genetics and Society Spring. 2 credits. Prerequisites: Biological Sciences 281 and 330 or 331. Enrollment limited to senior biological sciences majors, with preference given to students concentrating in genetics and development.

Lecs., T 2:30-4.25. R. A. Calvo, H. T. Svenson. Presentation of the technology and discussion of the ethical, social, and legal implications of recent advances in human genetics. Among the topics that may be considered are new reproductive strategies, physicians' responsibilities, sex selection, wrongful life and wrongful birth, XYY controversy, IQ and race, eugenics, genetic counseling, and gene therapy. Students lead most discussions.

483 Molecular Aspects of Development Spring. 3 credits. Prerequisites: Biological Sciences 281, 330 or 331, and 386.

Lecs., T R 10-10; 11-45. M. F. Wolfer. An examination of the molecular biology of developing systems, with emphasis on the genomic, transcriptional, post-transcriptional, translational, and differential aspects of gene expression. Developmental aspects of prokaryotic and eukaryotic systems are considered, but emphasis is on the latter. Topics to be discussed include changes in chromatin structure, DNA rearrangements, control of RNA synthesis and processing, translational controls, nucleo-cytoplasmic interactions, and genetic responses to hormone treatment. The regulation of selected developmental systems is considered in detail.

484 Molecular Evolution Fall. 3 credits. Prerequisites: Biological Sciences 281 and organic chemistry. Offered alternate years. Next offered spring 1990.

Lecs., T R 11-15. R. J. MacIntyre. An analysis of evolutionary changes in proteins and nucleic acids, and gene-enzyme variability in the species of populations. Theories on the evolution of the genetic code and the construction of phylogenetic trees from biochemical data are discussed. The second half of the course concerns the evolution and the organization of genomes from viruses to higher eukaryotes.

485 Microbial Genetics, Lectures Fall. 2 credits. Limited to upperclass and graduate students. Prerequisites: Biological Sciences 281 and Microbiology 290, or written permission of instructor. S-U grades optional.

Lecs., W 7:30-9:25 p.m. S. A. Zahler. Genetics of bacteria and their viruses, with emphasis on the mechanisms of genetic phenomena.

486 Immunogenetics (also Animal Science 486) Fall. 3 credits. Limited to seniors and graduate students. Prerequisites: an introductory course in genetics or concurrent or previous enrollment in basic immunology, or written permission of instructor. Lecs., and disc, M W F 10-10. R. R. Dieten. The genetic control of a variety of cellular antigens and their use in understanding biological and immunological functions. The genetics of antibody diversity, antigen recognition, immune response, transplantation, and disease resistance are discussed.

487 Microbial Genetics, Laboratory Fall. 3 credits. Prerequisites: Biological Sciences 281 and 330. Enrollment limited to 16 students. Prerequisites: concurrent or previous enrollment in Biological Sciences 485, Microbiology 291 or equivalent, and written permission of instructor. Lecs. and disc, T 1:25-4:25; additional hours to be arranged. S. A. Zahler. Problem solving in bacterial genetics.

488 Genetics of Unicellular Eucaryotes Spring. 2 credits. Prerequisites: Biological Sciences 281, 330 or 331, and 485, or written permission of instructor. S-U grades optional.


An advanced overview of genetic studies in two widely divergent groups of unicellular eucaryotes: yeasts and yeasts. Both formal genetic and molecular approaches to selected problems of biological interest in these organisms are discussed.

780 Current Topics in Genetics Spring. 2 credits. May be repeated for credit. Primarily for graduate students, with preference given to majors in the Field of Genetics; written permission of instructor required for undergraduates. Limited to 20 students. No auditors. S-U grades optional, with permission of instructor. Sem to be arranged. Staff. A seminar course with critical presentation and discussion by students of original research papers in a particular area of current interest. Content of the course and staff direction vary each year and are announced a semester in advance.

781 Problems in Genetics and Development Fall. 1 credit. Limited to first-year graduate students in the Field of Genetics. Disc to be arranged. T. D. Fox.

An introduction to the research literature in selected areas through weekly problem sets and discussions.

Related Courses in Other Departments

Animal Cytogenetics (Animal Science 419)
Animal Development (Veterinary Medicine 507)
Current Topics in Biochemistry (Biological Sciences 731-736)
Laboratory in Plant Molecular Biology (Biological Sciences 641)
Organic Evolution (Biological Sciences 378)
Plant Growth and Development (Biological Sciences 644)
Plant Molecular Genetics (Biological Sciences 653)
Reproduction and Development of Marine Invertebrates (Biological Sciences 486)
Undergraduate Research in Biology (Biological Sciences 499)

Neurobiology and Behavior

221 Neurobiology and Behavior I: Introduction to Behavior Fall. 3 or 4 credits (4 credits with discussion and term paper). 4-credit option required of students concentrating in neurobiology and behavior. Each disc limited to 20 students, with preference given to students concentrating in neurobiology and behavior. Not open to freshmen. Prerequisite: one year of introductory biology for majors. May be taken independently of Biological Sciences 222. S-U grades optional.

Lecs., M W F 12:20; disc to be arranged. T. D. Seeley and staff.

A general introduction to the field of behavior. Topics include evolution and behavior, behavioral ecology, sociobiology, chemical communication, neuroethology, rhythmicity, orientation and navigation, and hormonal mechanisms of behavior.

222 Neurobiology and Behavior II: Introduction to Neurobiology Spring. 3 or 4 credits (4 credits with discussion and term paper). 4-credit option required of students concentrating in neurobiology and behavior. Each disc limited to 20 students, with preference given to students concentrating in neurobiology and behavior. Not open to freshmen. Prerequisites: one year of introductory biology for majors and one year of chemistry. May be taken independently of Biological Sciences 221. S-U grades optional.

Lecs., M W F 12:20; disc to be arranged. R. R. Hoy and staff.

A general introduction to the field of cellular and integrative neurobiology. Topics include neural systems, neuroanatomy, developmental neurobiology, electrical properties of nerve cells, synaptic mechanisms, neurochemistry, motor systems, sensory systems, learning, and memory.
322 Hormones and Behavior (also Psychology 322) Spring. Limited to 25 upperclass students. Prerequisites: one year of introductory biology, and Biological Sciences 221 or 222 or a course in psychology. S-U grades optional. Behavior of animals, including humans. Major emphasis is on sexual, parental, and aggressive behavior.

324 Biopsychology Laboratory (also Psychology 324) Fall. 4 credits. Limited to 25 upperclass students. Prerequisites: laboratory experience in biology or psychology, Biological Sciences 221 and 222 or Psychology 233 and 222, and permission of instructor. S-U grades optional. Labs, TR 10:10–11:30, disc to be arranged. E. Adkins Regan, R. E. Johnston. Experiments designed to provide research experience in animal behavior (including learning) and its neural and hormonal mechanisms. A variety of techniques, species, and behavior patterns are included.

326 The Visual System Spring. 4 credits. Prerequisite: Biological Sciences 222 or permission of instructor. S-U grades optional. Offered alternate years. Lees, M W F 10:10, disc, 1 hour each week to be arranged. H. C. Howland. The visual systems of vertebrates and invertebrates are discussed in breadth and depth. Topics covered include the optics of eyes, retinal neurophysiology, and structure and function of higher visual centers.

396 Introduction to Sensory Systems (also Psychology 396) Spring. 3 or 4 credits (4 credits with term paper). No auditors. Prerequisites: an introductory course in neurobiology, and a second course in neurobiology or behavior or perception or cognition or biopsychology; students are expected to have elementary knowledge of perception, neurophysiology, behavior, and chemistry. Permission of instructor required for 4-credit option. S-U grades optional for graduate students only. Offered alternate years. Not offered 1987–88.

420 Topics in Neurobiology and Behavior Fall or Spring. Variable credit. May be repeated for credit. Primarily for undergraduates. S-U grades optional. To be arranged. Staff. Courses on selected topics in neurobiology and behavior; can include lecture and seminar courses. Topics, instructors, and consultation meetings are listed in the division’s catalog supplement issued at the beginning of the semester.

424 Neuroethology Fall. 3 credits. Prerequisites: Biological Sciences 221 and 222. S-U grades optional for graduate students only. Offered alternate years. Lees, M W 11:15, disc. F 11:15. C. D. Hopkins. The integrated study of neurobiology and animal behavior. Representative topics include basic communication in insects and amphibians, vocal mechanisms and plasticity of bird song, mammalian hearing, bat echolocation, prey detection by owls, electrophysiology of hormone communication, neurobehavior of vision in anurans, mammalian visual processing, command neurons and decision networks, locomotion and motor-pattern generation, escape and avoidance, and neural correlates of learning. Assigned readings include original articles in the scientific literature. A term paper on the neural basis of animal behavior is required.

426 Electronics for Neurobiology Spring. 3 credits. Limited to 20 students. Prerequisites: Biological Sciences 222 and one year of introductory physics. Lees, T R 9:05, lab, 4 hours each week to be arranged. B. R. Land. Electromechanical and electronic devices and circuits are introduced. Topics include a review of basic electrical concepts, the cell as a circuit, design of amplifiers and pulse generators for biological use, and computer interfacing to an experiment.

427 Animal Social Behavior Fall. 3 credits. Limited to 30 students. Prerequisites: Biological Sciences 221 and 261 or 262. S-U grades optional, with permission of instructor. Offered alternate years. Not offered 1987–88.


491 Principles of Neurophysiology Fall. 4 credits. Limited to 20 students. Biological Sciences 222 or written permission of instructor. Lees, T R 10:10, lab, M or W 12:20–4:25; additional hours to be arranged. R. L. Poppe. A lecture and laboratory course designed to teach the theory and techniques of electrophysiological study of the nervous system. Topics include electrical modeling of cells, intracellular and extracellular recording, and analysis of laboratory data.

493 Developmental Neurobiology Fall. 3 credits. Prerequisite: Biological Sciences 222 or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88.

495 Membrane Ion Channels Fall. 3 credits. Limited to 50 students. Prerequisites: Biological Sciences 222, college introductory physics, and calculus, or permission of instructor. S-U grades optional. Offered alternate years.

497 Neurochemistry and Molecular Neurobiology Fall. 3 credits. Limited to 30 students. Prerequisites: Biological Sciences 222 and either 330 or 331, or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88.

562 Laboratory in Neural Systems and Behavior Spring. 3 credits. Limited to 6 students concentrating in neurobiology and behavior. The experimental studies of laboratory animals, plants, and microorganisms. Studies of animals, plants, and microorganisms. Studies of nervous systems and behavior in animals, plants, and microorganisms. Studies of nervous systems and behavior in animals, plants, and microorganisms. Studies of nervous systems and behavior in animals, plants, and microorganisms.}

563 Chemical Communication (also Chemistry 563) Fall. 3 credits. Primarily for research-oriented students. Limited to 30 senior and graduate students. Prerequisites: one year of introductory biology for majors or equivalent, course work in biochemistry, and Chemistry 358 or equivalent. Offered alternate years. Lees, M W F 1:10. T. E. Isen, J. Meinwald, W. L. Roelofs, and guest speakers. The production, transmission, and reception of chemical signals in communicative interactions of animals, plants, and microorganisms. Studies of insects are emphasized. Specific topics are treated with varied emphasis on (a) basic chemical and ecological, behavioral, and evolutionary principles.
620 Sex Differences in Brain and Behavior (also Psychology 524) Spring. 2 credits. Limited to 12 students. Prerequisite: Biological Sciences 322 or permission of instructor. Disc and sem. M W 3:30–5:30. T. DeVoogt. A survey of the newly discovered animal models for sex differences in the brain. Topics include the role of steroids in brain development, whether hormones can modify the structure of the adult brain, and the consequences of such sex differences in anatomy for behavior.

694 Comparative Vertebrate Neuroanatomy Spring. 3 credits. Intended for juniors, seniors, and graduate students. Prerequisite: Biological Sciences 222 or equivalent. S-U grades optional. Offered alternate years. Not offered 1987–88. Lects. TR 10–11:30 A. H. Bass. Organization and evolution of neuronanatomical pathways as substrates for species-typical vertebrate behaviors. The course is divided into two major sections: principles of brain organization and vertebrate brain evolution.

720 Seminar in Advanced Topics in Neurobiology and Behavior Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades optional. Sem to be arranged. Staff. Students. Designed to provide several study groups each semester on specialized topics. A group may meet for whatever period is judged adequate to enable coverage of the selected topic. Ordinary topics are selected and circulated during the preceding semester. Discussion of current literature is encouraged. Suggestions for topics should be submitted by faculty or students to the chairperson of the Section of Neurobiology and Behavior.

721 Graduate Survey of Behavior Fall. 1 credit. Limited to graduate students. Concurrent registration in Biological Sciences 221 is not required. S-U grades optional. Sem to be arranged. T. D. Seeley and staff. A survey course involving readings of the original literature in behavior. A weekly seminar, primarily in the form of student-led discussions, is held to discuss readings linked to the material presented in Biological Sciences 221.

722 Graduate Survey of Neurobiology Spring. 1 credit. Limited to graduate students. Concurrent registration in Biological Sciences 222 is not required. S-U grades optional. Sem to be arranged. R. R. Hoy and staff. A survey course involving readings of the original literature in neurobiology. A weekly seminar, primarily in the form of student-led discussions, is held to discuss readings linked to the material presented in Biological Sciences 222.

723 Advanced Topics in Animal Behavior Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students in behavior. Prerequisite: permission of instructor. S-U grades optional. Sem to be arranged. Staff. A seminar on a specific topic in animal behavior. The instructor presents lectures during the first few course meetings; the remainder of the course is devoted to student presentations. Topic and instructor are listed in the division’s catalog supplement issued at the beginning of the semester.

724 Field Methods in Animal Behavior Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students in behavior. Prerequisite: permission of instructor. S-U grades optional. Sem and fieldwork to be arranged. Staff. A seminar-field experience course designed for first-year graduate students in animal behavior. Weekly seminars discussing field methodology, data collection, and hypothesis testing are followed by an intensive period (ten days to two weeks) in the field. Specific topics and field sites vary from semester to semester. Topic and instructor are listed in the division’s catalog supplement issued at the beginning of the semester.

790 Advanced Topics in Cellular and Molecular Neurobiology Fall or spring. Variable credit. May be repeated for credit. Limited to graduate students and advanced undergraduates concentrating in neurobiology and behavior. Prerequisite: Biological Sciences 222. S-U grades optional. Lects and sem to be arranged. Staff. A lecture-seminar course on selected topics in cellular and molecular neurobiology. Students read original papers in the scientific literature and lead discussions of these articles. Suggestions for topics may be submitted by faculty or students to the chairperson of the Section of Neurobiology and Behavior. Topic and instructor are listed in the division’s catalog supplement issued at the beginning of the semester.

792 Advanced Laboratory in Cellular and Molecular Neurobiology Fall or spring. 2 credits. May be repeated for credit. Primarily for graduate students. Prerequisites: Biological Sciences 330 or 331 or equivalent, 491 or equivalent, and written permission of instructor. S-U grades optional. Lab to be arranged. Staff. A two-week intensive laboratory course designed to provide experience with a specific technique currently used in cellular and molecular neurobiology. The technique under study and instructor in charge vary from semester to semester and are listed in the division’s catalog supplement issued at the beginning of the semester.

793 Advanced Topics in Integrative Neurobiology Fall or spring. Variable credit. May be repeated for credit. Primarily for graduate students; written permission of instructor required for undergraduates. S-U grades optional. Lects and dissertation to be arranged. Staff. A course designed to provide in-depth knowledge of current research in anatomical and physiological bases of vertebrate and invertebrate behavior. Readings are primarily from specialty books and selected journal articles. Topic and instructor are listed in the division’s catalog supplement issued at the beginning of the semester.

794 Advanced Laboratory Techniques in Integrative Neurobiology Fall or spring. Variable credit. May be repeated for credit. Prerequisite: permission of instructor based upon a personal interview. Lab to be arranged. Staff. A laboratory in the integrative, or neuroethological, approach to studies of animal behavior. Designed to provide practical working knowledge of research methods in anatomical, physiological, and behavioral approaches to studies of vertebrate and invertebrate behavior. Laboratory technique to be covered and instructor are listed in the division’s catalog supplement issued at the beginning of the semester.

Related Courses in Other Departments

Animal Behavior (Psychology 535)
Biochemistry and Human Behavior (Psychology 361 and Nutritional Sciences 361)
Brain and Behavior (Psychology 425)
Developmental Biopsychology (Psychology 422)
Evolution of Human Behavior (Psychology 326)
Human Behavior: A Sociobiological Perspective (Anthropology 476)
Insect Behavior Seminar (Entomology 622)

Mammalian Neurophysiology (Biological Sciences 450)
Teaching Experience (Biological Sciences 498)
Undergraduate Research in Biology (Biological Sciences 499)

Courses in Marine Sciences

Although there is no concentration in marine sciences offered to Cornell undergraduates, there is extensive opportunity at the undergraduate level to prepare for more advanced study. Students interested in the marine sciences may enroll in courses offered at Cornell’s Shoals Marine Laboratory (SML), a seasonal field station located on ninety-five-acre Appledore Island, six miles off the Maine and New Hampshire coasts. The Ithaca campus functions of the Shoals Marine Laboratory are centered in the Cornell Marine Programs Office, G41 Stimson Hall. The office serves as an advising center for students interested in the marine sciences, maintains a current inventory of updated information on graduate study and career opportunities as well as on marine programs at other institutions, and administers the SEA Semester, a 17-credit program offered in cooperation with the Sea Education Association.

The following marine sciences courses are currently administered by the Cornell Marine Programs Office.

306 Marine Microbiology Summer. 2 credits. Prerequisites: one year of introductory college biology and chemistry. Recommended: an introductory course in microbiology. S-U grades optional. A special 2-week course offered at Cornell’s Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G41 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $925.

329 Ecology of Animal Behavior Summer. 2 credits. Prerequisite: one year of introductory college biology. Recommended: course work in ecology, evolution, or behavior. S-U grades optional. A special 2-week course offered at Cornell’s Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G41 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $925.

363 Marine Biology for Teachers Summer. 1 credit. Primarily for teachers, grades 6 through 12, but open to others. Prerequisite: one year of introductory college biology. S-U grades optional. A special 10-day course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G41 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $650.

365 Marine Biology of Invertebrates (also Psychology 365) Summer. 2 credits. Prerequisite: one year of introductory college biology and chemistry. Recommended: an introductory course in physiology. S-U grades optional. A special 2-week course offered at Cornell’s Shoals Marine Laboratory (SML) on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G41 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $925.

382 Comparative Vertebrate Neuroanatomy Spring. 3 credits. Intended for juniors, seniors, and graduate students. Prerequisite: Biological Sciences 222 or equivalent. S-U grades optional. Offered alternate years. Not offered 1987–88. Lects. TR 10–11:30 A. H. Bass. Organization and evolution of neuronanatomical pathways as substrates for species-typical vertebrate behaviors. The course is divided into two major sections: principles of brain organization and vertebrate brain evolution.
Daily labs, fieldwork for 10 days. SML faculty.

364 Field Marine Science Summer 6 credits.
Prerequisite: one year of college biology or other supporting subject. S-U grades optional. A special 4-week course offered twice each summer at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 41 Stimson Hall. Estimated cost is tuition, room and board, and ferry transportation), $1,255.

Daily labs, and fieldwork for 4 weeks. 3 credit faculty members assisted by up to 15 visiting lecturers, including representatives of governmental agencies, and commercial fishermen. SML faculty.

Designated for the student who desires an initial overview and chemical oceanography and marine geology. Marine ecology and the effects of human activity on the marine environment are included.

365 Underwater Research Summer 2 credits.
Prerequisites: one year of college biology or other supporting subject, recognized scuba certification, and a medical examination. S-U grades optional. A special 2-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 41 Stimson Hall. Estimated cost includes tuition, room and board, and ferry transportation), $1,075.

Daily lectures and fieldwork for 2 weeks. Team-taught by a diving-safety officer, two faculty members, and guest lecturers.

For competent divers only. Covers special problems of underwater sampling, and diving equipment, use of dive tables, underwater instrumentation, special diving equipment, photographic techniques, integration with boat and shore facilities, and emergency procedures. Students are required to conduct a transect study on both soft and hard substrates.

366 – 370 SEA Semester In cooperation with the Sea Education Association (SEA), the Cornell Marine Programs Office offers a semester-length sequence of courses designed to provide college undergraduates with a thorough academic, scientific, and practical understanding of the sea. This sequence is repeated approximately once every two months throughout the year. Students spend the first half of SEA Semester (the six-week shore component) in Woods Hole, Massachusetts, receiving instruction in oceanography, nautical science, and maritime studies. The second half of SEA Semester (the six-week sea component) is spent at sea aboard R/V Westward, a 250-ton steel auxiliary-powered staysail schooner built in 1961. Westward normally puts to sea with a ship's company of thirty-four. The professional staff of nine includes the captain, the chief scientist, two science watch officers, three deck watch officers, an engineer, and a steward. In addition, one or more visiting investigators are frequently aboard. Up to twenty-five students round out the complement.

369 SEA Oceanographic Laboratory I 4 credits.
Prerequisite: Biological Sciences 366. Theories and problems raised in the shore component are tested in the practice of oceanography at sea. Students are introduced to the tools and techniques of the practicing oceanographer. During lectures and watch standing, students are instructed in the operation of basic oceanographic equipment; in the methodologies involved in the collection, reduction, and analysis of oceanographic data; and in the attendant operations of a sailing oceanographic research vessel.

370 SEA Oceanographic Laboratory II 4 credits.
Prerequisite: Biological Sciences 366. Building on the experience of Oceanographic Laboratory I, students assume increasing responsibility for conducting oceanographic research and overseeing operations of the vessel. The individual student is ultimately responsible directly to the chief scientist and the master of the vessel for the safe and orderly conduct of research activities and related operations of the vessel. Each student undertakes an individual research project designed during the shore component.

413 Adaptations of Marine Organisms Summer 4 credits.
Prerequisite: Biological Sciences 364 or 315. This course in physiological ecology is designed for students interested in the field of thermal biology. Growth in plant and animal populations is studied, with emphasis on selected algal and invertebrate examples from the Gulf of Maine. Topics covered include photosynthesis in the marine environment; respiration in intertidal organisms; carbohydrates, proteins, and lipids as nutritional and axiological components. The acclimation and tolerance of tide-pool biota, and biological responses to competition and grazing. Field and laboratory exercises explore principles and procedures used to characterize the physical, chemical, biological, and bionic environment of intertidal and subtidal organisms, including determination of temperature, light, salinity, oxygen and nutrient levels, and in vivo functional analyses of metabolic phenomena.

449 Marine Botany: Ecology of Marine Plants Summer 4 credits. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 41 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $1,295.

Daily labs, and fieldwork for 3 weeks. SML faculty.

An overview of the major marine algal groups, including aspects of anatomy, morphology, development, life histories, physiology, and use. Laboratories and fieldwork emphasize relationships between distribution and environmental parameters and involve student projects.

466 Ecology and Chemistry of Rock-Pool Environments Summer 4 credits.
Prerequisites: one year of introductory college chemistry and an introductory ecology course at the college level. S-U grades optional. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 41 Stimson Hall. Estimated cost includes tuition, room and board, and ferry transportation), $1,295.

Daily labs, and fieldwork for 3 weeks. SML faculty.

A field-oriented course emphasizing the interrelationships of the chemistry and biology of both rock- and tide-pool ecosystems. Special emphasis is given to the study of various pools on the island as natural laboratories. Laboratory work includes organism identification; chemical analyses of pools for nutrients, pH, alkalinity, dissolved carbon dioxide and oxygen content, and primary production; and lethal temperature, salinity, and oxygen level determinations for different species and populations. Lectures and class research projects cover the effects of pool morphology and algal growth on pool temperature, chemistry, and stratification; salinity changes caused by evaporation, rainfall, and seawater splash; dissolved oxygen and pH changes associated with primary production; nutrient dynamics relative to rainfall, flowthrough, primary production, microbial activities, and proximity to nesting birds; primary production differences among pool types; and predation experiments with fish. Oceanography and energy models for different rock-pool ecosystems are presented. The use of microcomputers for interpretation of data is emphasized.

467 Chemical Oceanography of Coastal Waters Summer 4 credits.
Prerequisites: one year of introductory college chemistry and an introductory marine science course at the college level. S-U grades optional. A special 3-week course offered at Cornell's Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 41 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $1,295.

Daily labs, and fieldwork for 3 weeks. SML faculty.

An introduction to the physiological ecology and functional morphology of marine plants and animals, with emphasis on the selected algal and invertebrate examples from the Gulf of Maine. Topics covered include photosynthesis in the marine environment; respiration in intertidal organisms; carbohydrates, proteins, and lipids as nutritional and axiological components. The acclimation and tolerance of tide-pool biota, and biological responses to competition and grazing. Field and laboratory exercises explore principles and procedures used to characterize the physical, chemical, biological, and bionic environment of intertidal and subtidal organisms, including determination of temperature, light, salinity, oxygen and nutrient levels, and in vivo functional analyses of metabolic phenomena.

Courses in Marine Sciences 257
A field-oriented course in the chemical oceanography of coastal waters. Lectures, frequent field trips, and laboratory sampling and analysis, includes tests of salinity, temperature, pH, chlorophyll, alkalinity, total CO₂, nutrients, organic material, and suspended matter in coastal waters, with some work on the analysis of coastal sediments.

**468 Marine Zooplankton Ecology**  
Summer. 2 credits. Limited to 20 students. Prerequisites: one year of introductory college biology and Biological Sciences 364 or equivalent, or a course in invertebrate zoology or introductory oceanography. S-U grades optional. A special 3-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $725.

Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.

An introduction to the biology of zooplankton and their ecological role in representative marine environments, including estuaries, coastal areas, open ocean gyres, and polar seas. Includes an overview of the morphology, taxonomy and reproduction of major planktonic groups in the coelenterates, crustaceans, ctenophores, chaetognaths, and tunicates. The role of these groups in different ecosystems is related to the hydrography of the area, as well as the trophic interactions of the dominant species. During several one-day cruises in the Gulf of Maine and Great Bay Estuary students use simple field techniques to address current research problems.

**477 Topics in Marine Vertebrae** Summer. 4 credits. Prerequisite: Biological Sciences 364 or 274 or a course in marine biology, S-U grades optional. A special 3-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $1,295.

Daily lecs, labs, and fieldwork for 3 weeks. SML faculty.

Topics in marine vertebrate biology emphasizing laboratory studies, field collections or observations, and readings from the current literature. Topics covered include systematics and life histories of the fish of Maine, marine mammals, evaluation of life history and parameters from otolith microstructure, teleost skeletal-muscular structure and function, population biology and the contemporary Gulf of Maine fisheries. Marine mammals, marine biology of sea turtles in cold water, coloniality in sea birds, avian adaptations to life at sea, evolution and systematics of marine mammals, diving physiology, and ecology and conservation of existing marine mammal populations.

**488 Reproduction and Development of Marine Invertebrates** Summer. 4 credits. Prerequisite: Biological Sciences 364 or a course in invertebrate zoology, S-U grades optional. A special 3-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $1,295.

Daily lecs, labs, and fieldwork for 3 weeks. SML faculty.

A laboratory-oriented course emphasizing processes of fertilization and early development through the metamorphosis of larvae in species selected from an extensive survey of local marine invertebrates. Practical experience includes collecting specimens intertidally and from the plankton, culturing embryos through metamorphosis, camera lucida and photomicrographic recording of embryonic development, and design and execution of basic experiments on eggs and embryos. Lectures complement laboratory work through phylogenetic examination of classical invertebrate embryology and modern experimental developmental biology.

**Archaeology of Maritime Communities**  
**Archaeology 300: Individual Study in Archaeology** Summer. 1 credit. Prerequisite: Archaeology 319 or permission of instructor; recognized scuba certification and a medical examination required for students enrolling in underwater research. A special 1-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $450.

Daily lecs, labs, and fieldwork for 1 week. SML faculty.

Fieldwork on various land sites and their adjacent offshore marine environments. Artifactual analysis, preliminary conservation, and the proper recording of finds are emphasized. Methods of archaeological research, including the use of archives and historical materials, and publication methodologies as well as the larger questions in the discipline are discussed. Students sufficiently qualified in underwater work have the opportunity to work on local wrecks.

**Coastal and Oceanic Law and Policy**  
**Natural Resources 300** Summer. 1 credit. A special 1-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $450.

Daily lecs and discs for 1 week. SML faculty.

Intended for persons interested in careers in management of marine or coastal resources or in the natural sciences related to marine policy related to ocean dumping, marine sanctuaries, environmental impact statements, water and air pollution, fisheries management, offshore gas and oil production, and territorial jurisdiction. Lectures on the status and history of law are accompanied by discussion of relevant policy and analysis of the efficacy of various legal techniques. A case study that requires extensive use of the laboratory’s library and personnel is assigned. The week includes a mock hearing.

**Introduction to Marine Pollution and its Control**  
**Agricultural Engineering 420** Summer. 2 credits. Prerequisite: Biological Sciences 364 or permission of instructor: a special 1-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $925.

Daily lecs, labs, and fieldwork for 2 weeks. SML faculty.

Dispersion modeling and the effects of pollutants (including oil, outfalls, solid wastes, sludge spoils, and radioactive wastes) are discussed from the perspectives of elementary physical oceanography and biological processes. Laboratories include basic methods for targeting and tracing wastewater, organic carbon determinations, microbial tests for Salmonella, Es. coli, and Streptococcus; and federal project fields.

**Marine and Coastal Geology (Geological Sciences 430)** Summer. 1 credit. Prerequisite: a special 1-week course in geology or permission of instructor. A special 1-week course offered at Cornell’s Shoals Marine Laboratory (SML), on an island off Portsmouth, N.H. For more details and an application, consult the SML office, G 14 Stimson Hall. Estimated cost (includes tuition, room and board, and ferry transportation), $450.

Daily lecs, labs, and fieldwork for 1 week. SML faculty.

With "the New England coast" defined as beginning at the ~200 meter isobath and proceeding westward, this course examines specific geological events and modern coastal processes, such as: seabed and surficial sediments. Petrology, geophysics, and the Peistocene geology of the region are investigated. Consideration of the geologic history of New England within the plate tectonic model is emphasized.

**Courses in Biophysics**

Biophysics is an interdisciplinary undergraduate and graduate program. A special program for undergraduate students in biophysics is offered as an independent concentration in the biological sciences major (see option 8 under "Concentration Areas and Requirements").
on this independent option is available in the Office for Academic Affairs, 210 Clark Hall.

The following courses are available for students interested in biophysics:

Biomechanical Systems—Analysis and Design (Mechanical and Aerospace Engineering 565)

Chemistry of Nucleic Acids (Chemistry 677)

Electron Microscopy for Biologists (Biological Sciences 600, 603, 606, 608)

Enzyme Catalysis and Regulation (Chemistry 672)

Introduction to Biophysics (Biological Sciences 309 and Applied and Engineering Physics 306)

Membrane Biophysics (Applied and Engineering Physics 615)

Membranes and Bioenergetics (Biological Sciences 632)

Modern Physical Methods in Macromolecular Characterization (Applied and Engineering Physics 616)

Neuroethology (Biological Sciences 424)

Photosynthesis (Biological Sciences 445 and Applied and Engineering Physics 601)

Physical Chemistry of Proteins (Chemistry 686)

Principles of Neurophysiology (Biological Sciences 491)

Protein Structure and Function (Biological Sciences 631)

Special Topics in Biophysical and Bioorganic Chemistry (Chemistry 782)

Special Topics in Biophysics (Applied and Engineering Physics 614)

Transport of Solutes and Water in Plants (Biological Sciences 649)

Faculty Roster

New York State College of Agriculture and Life Sciences

Adler, Kraig K., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior
Bates, David M., Ph.D., U. of California at Los Angeles. Prof., Bailey Hortorium
Byenbach, Klaus W., Ph.D., Washington State U. Assoc. Prof., Physiology/Veterinary Physiology
Bruins, Peter J., Ph.D., U. of Illinois. Prof., Genetics and Development
Cade, Thomas J., Ph.D., U. of California at Los Angeles. Prof., Ecology and Systematics
Calvo, Joseph M., Ph.D., Washington State U. William T. Keeton Professor in Biological Sciences; Biochemistry, Molecular and Cell Biology
Cook, Robert E., Ph.D., Yale U. Assoc. Prof., Ecology and Systematics/Cornell Plantations
Davies, Peter J., Ph.D., U. of Reading (England). Prof., Plant Biology
Davis, Jerrold I., Ph.D., U. of Washington. Asst. Prof., Bailey Hortorium
Doyle, Jeffrey J., Ph.D., Indiana U. Asst. Prof., Bailey Hortorium
Essex, Thomas, Ph.D., Harvard U. Jacob Gould Schurman Professor, Neurobiology and Behavior
Emken, Stephen T., Ph.D., U. of Michigan. Prof., Neurobiology and Behavior

Fox, Thomas D., Ph.D., Harvard U. Assoc. Prof., Genetics and Development
Gibson, Jane, Ph.D., U. of London (England). Prof., Biochemistry, Molecular and Cell Biology
Goldberg, Michael L., Ph.D., Stanford U. Asst. Prof., Genetics and Development
Hanson, Maureen R., Ph.D., Harvard U. Assoc. Prof., Genetics and Development
Harrison, Richard G., Ph.D., Cornell U. Assoc. Prof., Ecology and Systematics
Harriss-Warrick, Ronald P., Ph.D., Stanford U. Assoc. Prof., Neurobiology and Behavior
Hoppkins, Carl D., Ph.D., Bookbinder U. Prof., Neurobiology and Behavior
Jagendorf, Andre T., Ph.D., Yale U. Liberty Hyde Bailey Professor of Plant Physiology, Plant Biology
Keller, Elizabeth B., Ph.D., Cornell U. Prof., Biochemistry, Molecular and Cell Biology
Kemphues, Kenneth J., Ph.D., Indiana U. Asst. Prof., Genetics and Development
Lio, John T., Ph.D., Brandeis U. Assoc. Prof., Biochemistry, Molecular and Cell Biology
Loew, Ellis R., Ph.D., U. of California at Los Angeles. Assoc. Prof., Physiology/Veterinary Physiology
McCart, Richard E., Ph.D., Johns Hopkins U. Prof., Biochemistry, Molecular and Cell Biology
McCune, Amy R., Ph.D., Yale U. Asst. Prof., Ecology and Systematics
McIntyre, Ross J., Ph.D., Johns Hopkins U. Prof., Genetics and Development*
Marks, Peter L., Ph.D., Yale U. Assoc. Prof., Ecology and Systematics
Moffat, J. Keith, Ph.D., Cambridge U. (England). Prof., Biochemistry, Molecular and Cell Biology
Nasrallah, June B., Ph.D., Cornell U. Asst. Prof., Plant Biology
Nixon, Kevin C., Ph.D., U. of Texas at Austin. Asst. Prof., Bailey Hortorium
Owens, Thomas G., Ph.D., Cornell U. Assoc. Prof., Plant Biology
Papillo, Dominick J., Jr., Ph.D., U. of California at Davis. Prof., Plant Biology
Parthasarathy, Mandayam V., Ph.D., Cornell U. Prof., Plant Biology*
Pough, F. Harvey, Ph.D., U. of California at Los Angeles. Prof., Ecology and Systematics/Entomology
Quaroni, Andrea, Ph.D., U. of Pavia (Italy). Asst. Prof., Physiology
Roberts, Jeffrey W., Ph.D., Harvard U. Assoc. Prof., Biochemistry, Molecular and Cell Biology
Root, Richard B., Ph.D., U. of California at Berkeley. Prof., Ecology and Systematics/Entomology
Spanswick, Roger M., Ph.D., U. of Edinburgh (Scotland). Prof., Plant Biology
Tye, Bik-Kwong, Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Biochemistry, Molecular and Cell Biology
Uh, Natalie W., Ph.D., Cornell U. Assoc. Prof., Bailey Hortorium
Wtg, Volker M., Ph.D., Harvard U. Assoc. Prof., Biochemistry, Molecular and Cell Biology
Walcott, Charles, Ph.D., Cornell U. Prof., Neurobiology and Behavior/Laboratory of Ornithology
Young, David A., Ph.D., Claremont Graduate School. Assoc. Prof., Bailey Hortorium
Zahler, Stanley A., Ph.D., U. of Chicago. Prof., Genetics and Development

Other Teaching Personnel

Alexander, Renee R., Ph.D., Cornell U. Sr. Lecturer, Botany, Molecular and Cell Biology
Calvo, Rita A., Ph.D., Cornell U. Lecturer, Genetics and Development
Dawley, Ellen M., Ph.D., University of Connecticut. Instructor, Ecology and Systematics
Dawley, Robert M., Ph.D., U. of Connecticut. Instructor, Ecology and Systematics

Ecklund, P. Richard, Ph.D., Oregon State U. Lecturer, Neurobiology and Behavior
Ferger, Martha F., Ph.D., Cornell U. Medical College. Sr. Lecturer, Biochemistry, Molecular and Cell Biology
Glaeser, Jon C., Ph.D., Cornell U. Sr. Lecturer, Neurobiology and Behavior
Griffiths, Joan M., Ph.D., Cornell U. Lecturer, Biochemistry, Molecular and Cell Biology
Heiser, John B., Ph.D., Cornell U. Sr. Lecturer, Ecology and Systematics
McFadden, Carol H., Ph.D., Cornell U. Lecturer, Neurobiology and Behavior
Reiss, H. Carol, M.S., Cornell U. Lecturer, Plant Biology
Taylor, Martha R., Ph.D., Cornell U. Lecturer, Neurobiology and Behavior
Wilkinson, Maria L., Ph.D., U. of Chile. Lecturer, Biochemistry, Molecular and Cell Biology

Joint Appointees

Aischt, Ruth G., Adjunct Asst. Prof., Boyce Thompson Institute/Plant Biology
Barker, Robert, Prof., Provost's Office/Biochemistry, Molecular and Cell Biology
Bedford, Barbara L., Adjunct Asst. Prof., Ecosystems Research Center/Ecology and Systematics
Bloom, Stephen E., Assoc. Prof., Poultry and Avian Sciences/Biological Sciences
Borner, Arthur C., Adjunct Prof., U. of New Hampshire/Biological Sciences
Brown, William L., Jr., Prof., Entomology/Ecology and Systematics
Butler, Walter R., Assoc. Prof., Animal Science/Physiology
Currie, W. Bruce, Assoc. Prof., Animal Science/Physiology
Edelestein, Stuart M., Adjunct Prof., U. of Geneva (Switzerland)/Biochemistry, Molecular and Cell Biology
Foote, Robert H., Jacob Gould Schurman Professor, Animal Science/Physiology
Kochian, Leon V., Adjunct Asst. Prof., USDA Science and Education Administration/Plant Biology
Korf, Richard P., Prof., Plant Pathology/Bailey Hortorium
LaRue, Thomas A., Adjunct Prof., Boyce Thompson Institute/Plant Biology
Leopold, A. Carl, Adjunct Prof., Boyce Thompson Institute/Plant Biology
Novak, Joseph D., Prof., Education/Biological Sciences/Entomology, David, Prof., Entomology/Ecology and Systematics
Richmond, Milo E., Assoc. Prof., USDA Fish and Wildlife Service/Natural Resources/Ecology and Systematics
Sazali, Aladar A., Adjunct Asst. Prof., Boyce Thompson Institute/Biological Sciences
Tamas, Imre A., Adjunct Assoc. Prof., Ithaca College/Plant Biology
Thompson, John F., Adjunct Prof., USDA Science and Education Administration/Plant Biology
VanDemark, Paul J., Prof., Microbiology/Biological Sciences
Via, Sara, Asst. Prof., Entomology/Ecology and Systematics
Weeden, Norman F., Asst. Prof., Horticultural Sciences/Bailey Hortorium
Wheeler, Quentin D., Asst. Prof., Entomology/Bailey Hortorium

College of Arts and Sciences

Aquadro, Charles F., Ph.D., U. of Georgia. Asst. Prof., Genetics and Development/Ecology and Systematics
Bass, Andrew H., Ph.D., U. of Michigan. Asst. Prof., Neurobiology and Behavior
Blacklaw, Antonia W., Ph.D., U. of London (England). Prof., Genetics and Development
Brown, William J., Ph.D., U. of Texas Health Science Center at Dallas. Asst. Prof., Biochemistry, Molecular and Cell Biology
### Joint Appointees

- **Likens, Gene E., Adjunct Prof., New York Botanical Garden Institute of Ecosystem Studies.**
- **Albrecht, Genia S., Ph.D., U. of Washington. Lecturer, Biocchemistry, Molecular and Cell Biology.**
- **Chapot, Brian F., Ph.D., Duke U. Prof., Ecology and Evolutionary Biology.**
- **Hammes, Gordon G., Horace White Professor of Chemistry and Biochemistry.**
- **Fessenden-Radlen, June M., Ph.D., Tufts U. Assoc. Prof., Neurobiology, Molecular and Cell Biology.**
- **Albrecht, Genia S., Ph.D., U. of Washington. Lecturer, Biocchemistry, Molecular and Cell Biology.**
- **Other Teaching Personnel**
  - **Wu, Ray D., Ph.D., U. of Pennsylvania. Prof., Biochemistry, Molecular and Cell Biology.**
  - **Flairston, Nelson G., Jr., Ph.D., U. of Washington. Prof., Neurobiology and Behavior.**
  - **Capranica, Robert R., Sc.D., Massachusetts Inst. of Technology Prof., Neurobiology and Behavior.**
  - **Rabinowitz, Deborah, Ph.D., U. of Chicago. Assoc. Prof., Biochemistry, Molecular and Cell Biology.**
  - **Podleski, Thomas R., Ph.D., Columbia U. Prof., Neurobiology and Behavior.**
  - **Power, Alison G., Ph.D., U. of Washington. Asst. Prof., Ecology and Systematics/Program on Science, Technology, and Society.**
  - **Hoy, Ronald R., Ph.D., Stanford U. Prof., Neurobiology and Behavior.**
  - **Kennedy, Kenneth A., Ph.D., U. of California at Berkeley. Prof., Ecology and Systematics.**
  - **Provine, William B., Ph.D., U. of Chicago. Prof., Ecology and Systematics/History.**
  - **Sherman, Paul W., Ph.D., U. of Michigan. Assoc. Prof., Neurobiology and Behavior.**
  - **Turgeon, Robert, Ph.D., Carleton U. (Canada). Assoc. Prof., Plant Biology.**
  - **Wilson, David B., Ph.D., Stanford U. Prof., Biochemistry, Molecular and Cell Biology.**
  - **Wolfe, Mariana F., Ph.D., Stanford U. Asst. Prof., Genetics and Development.**
  - **Simpson, Harry T. J., Ph.D.,Indiana U. Prof., Biological Sciences/Genetics and Development.**

### New York State College of Veterinary Medicine

- **Corradino, Robert A., Ph.D., Cornell U. Assoc. Prof., Physiology/Veterinary Physiology.**
- **Fortune, Joanne E., Ph.D., Cornell U. Assoc. Prof., Physiology/Veterinary Physiology.**
- **Gasteiger, Edgar L., Ph.D., U. of Minnesota. Prof., Physiology/Veterinary Physiology.**
- **Hansel, William, Ph.D., Cornell U. Liberty Hyde Bailey Professor of Animal Physiology.**
- **Lengemann, Frederick W., Ph.D., U. of Wisconsin at Madison. Prof., Physiology/Veterinary Physiology.**
- **Wasserman, Robert H., Ph.D., Cornell U. Prof., Physiology/Veterinary Physiology/Nutritional Sciences.**

### Joint Appointees

- **Bergman, Emmett N., Prof., Veterinary Physiology/Physiology.**
- **Dobson, Alan, Prof., Veterinary Physiology/Physiology.**
- **Dunny, Gary M., Assoc. Prof., Microbiology/Genetics and Development.**
- **Gillespie, James H., Prof., Microbiology/Biological Sciences.**
- **Kallfelz, Francis A., Prof., Clinical Sciences/Veterinary Physiology.**
- **Kapp, Katherine A., Assoc. Prof., Veterinary Physiology.**
- **Kallfelz, Francis A., Prof., Clinical Sciences/Veterinary Physiology.**
- **Nathanelsz, Peter W., Leading Prof., Clinical Sciences/Veterinary Physiology.**
- **Woodley, John F., Prof., Veterinary Physiology.**

### College of Engineering

- **Cisne, John L., Assoc. Prof., Geological Sciences/Biological Sciences.**

### Division of Biological Sciences

- **Corradino, Robert A., Ph.D., Cornell U. Assoc. Prof., Physiology/Veterinary Physiology.**
- **Fortune, Joanne E., Ph.D., Cornell U. Assoc. Prof., Physiology/Veterinary Physiology.**
- **Gasteiger, Edgar L., Ph.D., U. of Minnesota. Prof., Physiology/Veterinary Physiology.**
- **Hansel, William, Ph.D., Cornell U. Liberty Hyde Bailey Professor of Animal Physiology.**
- **Lengemann, Frederick W., Ph.D., U. of Wisconsin at Madison. Prof., Physiology/Veterinary Physiology.**
- **Tapper, Daniel N., Ph.D., Cornell U. Prof., Physiology/Veterinary Physiology.**
- **Wasserman, Robert H., Ph.D., Cornell U. Prof., Physiology/Veterinary Physiology/Nutritional Sciences.**

### Division of Nutritional Sciences

- **Corradino, Robert A., Ph.D., Cornell U. Assoc. Prof., Physiology/Veterinary Physiology.**
- **Fortune, Joanne E., Ph.D., Cornell U. Assoc. Prof., Physiology/Veterinary Physiology.**
- **Gasteiger, Edgar L., Ph.D., U. of Minnesota. Prof., Physiology/Veterinary Physiology.**
- **Hansel, William, Ph.D., Cornell U. Liberty Hyde Bailey Professor of Animal Physiology.**
- **Lengemann, Frederick W., Ph.D., U. of Wisconsin at Madison. Prof., Physiology/Veterinary Physiology.**
- **Tapper, Daniel N., Ph.D., Cornell U. Prof., Physiology/Veterinary Physiology.**
- **Wasserman, Robert H., Ph.D., Cornell U. Prof., Physiology/Veterinary Physiology/Nutritional Sciences.**

### Other Teaching Personnel

- **Abbrecht, Genia S., Ph.D., U. of Washington. Lecturer, Biocchemistry, Molecular and Cell Biology.**
- **Eberhard, Carolyn G., Ph.D., Boston U. Sr. Lecturer, Plant Biology.**
- **Joint Appointees**
  - **Likens, Gene E., Adjunct Prof., New York Botanical Garden Institute of Ecosystem Studies.**
  - **Regn, Elizabeth Adkins, Assoc. Prof., Psychology/Neurobiology and Behavior.**
  - **Hammes, Gordon G., Horace White Professor of Chemistry and Biochemistry.**
  - **Biochemistry, Molecular and Cell Biology.**
  - **Leks, Gene E., Adjunct Prof., New York Botanical Garden Institute of Ecosystem Studies.**
  - **Arboretum/ Ecology and Systematics.**

### Joint appointments with the College of Arts and Sciences

- **Joint appointment with the College of Veterinary Medicine.**
- **Joint appointment with the College of Agriculture and Life Sciences.**
- **Joint appointment with the College of Engineering.**
College of Engineering

Administration

William B. Streett, dean
K. Bingham Cady, associate dean for college affairs
S. Leigh Phoenix, associate dean for research and graduate studies
Christopher Pottle, associate dean for computing
Richard N. White, associate dean for undergraduate student affairs
John C. Belina, assistant dean, director of engineering admissions and advising
Judy Jackson, director of minority programs
Gilbert F. Rankin, director of administrative operations and facilities
Gladys J. McConkey, director of publications
Richard K. Mosher, registrar

Facilities and Special Programs

Most of the academic units of the College of Engineering are centered in the complex of modern buildings on the Joseph N. Pew, Jr. Engineering Quadrangle. Facilities for applied and engineering physics are located in Clark Hall on the College of Arts and Sciences campus, and facilities for agricultural engineering are centered in Riley-Hobb Hall on the campus of the New York State College of Agriculture and Life Sciences.

Special university and college facilities augment the laboratories operated by the various engineering schools and departments, and special centers and programs contribute to opportunities for study and research.

Computing equipment, for example, is available through centers administered by the university and by the College of Engineering, as well as in laboratories run by schools, departments, or programs. The university facilities include personal computers for student use, terminals connected to the mainframe, computer-graphics equipment, and a supercomputer. The College of Engineering operates, in addition to several computing centers for student use, the Computer-Aided Design Instructional Facility, which provides advanced computer-graphics equipment used in course work throughout the college.

Cornell programs and centers of special interest in engineering include the following:

Center for Applied Mathematics. A cross-disciplinary center that administers a graduate program and incorporates the recently formed, federally sponsored Mathematical Sciences Institute.

Center for Environmental Research. A sponsor of interdisciplinary programs that are currently in the areas of environmental law and policy, ecosystem research, remote sensing, and water resources.

Center for Radiophysics and Space Research. An interdisciplinary unit that facilitates research in astronomy and the space sciences.

Center for Theory and Simulation in Science and Engineering. A national supercomputer center used for advanced research in engineering and the physical and biological sciences.

Cornell High Energy Synchrotron Source. A high-energy synchrotron radiation laboratory operated in conjunction with the university's high-energy storage ring.

Cornell Manufacturing Engineering and Productivity Program. A joint venture of Cornell, industrial organizations, and the federal government to encourage the development and implementation of modern manufacturing systems.

Cornell Program in Power Systems Engineering. A research and instructional program centered in a laboratory that has the most complete real-time model of an electric power system ever constructed.

Earthquake Engineering Research Center. A facility recently established by the National Science Foundation at a group of universities in New York State.

Laboratory of Plasma Studies. A center for interdisciplinary research in plasma physics and lasers.

Materials Science Center. An interdisciplinary facility with substantial support from the National Science Foundation, providing sophisticated equipment.

National Astronomy and Ionosphere Center. The world's largest radio-radar telescope facility, operated by Cornell in Puerto Rico.

National Nanofabrication Facility. A center that provides equipment and services for research in the science, engineering, and technology of structures (including electronic components) with dimensions as small as the nanometer range.

Program of Computer Graphics. An interdisciplinary research center that operates one of the most advanced computer-graphics laboratories in the United States.

Program on Science, Technology, and Society. A cross-disciplinary unit that sponsors courses and promotes research.

SRC Center for the Program on Microscience and Technology. A center sponsored by the Semiconductor Research Corporation to promote research essential to the development of VLSI devices and circuits.

Ward Laboratory of Nuclear Engineering. Irradiation, isotope production, and activation analysis facilities for interdisciplinary research.

Programs sponsored by College of Engineering units include several for industrial affiliates. These are in the areas of injection molding, computer science, materials science, geologic study of the continents, and submicrometer structures.

Degree Programs

Cornell programs in engineering and applied science lead to the degrees of Bachelor of Science, Master of Engineering (with field designation), Master of Science, and Doctor of Philosophy.

General academic information concerning the Bachelor of Science degree is given here under the heading "Undergraduate Study." Curricula for major studies are described under the various academic areas.

Programs leading to the Master of Science and Doctor of Philosophy degrees are administered by the Graduate School. They are described in the Announcement of the Graduate School and the special Announcement Graduate Study in Engineering and Applied Science. The professional Master of Engineering programs and cooperative programs with the Johnson Graduate School of Management are described below.

Undergraduate Study

Bachelor of Science (B.S.) degrees are offered in the following areas.*

Agricultural engineering

Chemical engineering

Civil engineering

College program

Computer science

Electrical engineering

Engineering physics

Geological sciences

Materials science and engineering

Mechanical engineering

Operations research and industrial engineering

Students in the College of Engineering begin their undergraduate studies in the Common Curriculum, which is administered by the faculty members of the Common Curriculum Governing Board (CCGB) through the associate dean for undergraduate programs and the Office of Advising and Counseling. Subsequently most students enter field programs, which are described separately for each academic area. Alternatively students may enter the College Program (described below), which permits them to pursue a course of study adapted to individual interests.

Students interested in bioengineering may arrange a suitable curriculum within one of the field programs or through the College Program. Information about these options is available in the Office of Admissions and Undergraduate Affairs, 167 Olin Hall.

* Agricultural engineering, chemical engineering, civil engineering, electrical engineering, engineering physics, materials science and engineering, mechanical engineering, and operations research and industrial engineering are accredited by the Engineering Accreditation Commission of the Accreditation Board for Engineering and Technology.

† To major in agricultural engineering students generally enroll in the College of Agriculture and Life Sciences for the first, second, and fourth years, and jointly in that college and the College of Engineering for the third year.

Requirements for Graduation

To receive the Bachelor of Science degree, students must meet the requirements of the Common Curriculum, as set forth by the College of Engineering, including the requirements of the field program, as established by the school or department with which they become affiliated. The Common Curriculum is composed of courses in eight categories.

Course Category

Credits

1) Mathematics 16
2) Physics 12
3) Chemistry 4
4) Freshman writing seminar 4
5) Computer programming 4
6) Engineering distribution (4 courses) 12
7) Humanities and social sciences (6 courses) 18
8) Electives

Approved electives 9
Free electives 6
Technical electives 6

One approved course in computing applications must also be taken; this course may simultaneously satisfy some other requirement.

Credits for courses in the field program vary between 36 and 48, depending on which program is chosen. Because of this variation the credits needed for graduation range between 129 and 141. Two terms of physical education must be taken in the freshman year to satisfy a university requirement.

Mathematics

The normal program in mathematics includes Mathematics 191 or 193, 192, 293, and 294. Students who have little or no acquaintance with calculus take Mathematics 191. Students with some knowledge of calculus, but not enough for advanced placement, take Mathematics 193.

Physics

The normal program in physics includes Physics 112 or 116, 213 or 217, and 214 or 218. Students in the Field Program in Civil Engineering may substitute Chemistry 208 for Physics 214.
Chemistry
Chemistry 207 is required for all students and is normally taken in the first freshman semester.

Freshman Writing Seminars
Each semester of their freshman year, students choose a freshman writing seminar from among more than seventy courses offered by over twenty different departments in the humanities, social sciences, and expressive arts. These courses all offer the student practice in writing English prose. They also assure beginning students the benefits of a small class.

Computing
In either the first or second term of their freshman year, students take Engr 100, Introduction to Computer Programming. Before graduation they must take an additional course with a significant amount of computing applications; this course may also be used to meet another graduation requirement. Courses that satisfy this requirement are Ag En 475, Engr 211, Engr 222, Engr 241, Engr 264, EE 424, M&AE 489, M&AE 575, and M&AE 670. The recommended choice for students intending to enter the Field Program in Engineering Physics is Engr 264; in Chemical Engineering, Engr 223 or 241; in Computer Science, Engr 222; in Electrical Engineering, Engr 211; in Civil Engineering, Engr 241; in Mechanical Engineering, M&AE 489, M&AE 575, or M&AE 670; and in Operations Research and Industrial Engineering, Engr 211.

Engineering Distribution
Four engineering distribution courses (12 credits) are required. These courses must be selected from four of the ten groups listed below. A student may use only one of the possible substitutions described:

1) Scientific computing
   Engr 211, Computers and Programming
   Engr 222, Introduction to Scientific Computing
   Engr 241, Engineering Computation

2) Materials science
   Engr 261, Introduction to Mechanical Properties of Materials
   Engr 262, Introduction to Electrical Properties of Materials

3) Mechanics
   Engr 202, Mechanics of Solids
   Engr 203, Dynamics

Students in the Field Program in Engineering Physics may substitute A&EP 333 for Engr 203.

4) Probability and statistics
   Engr 260, Introduction to Engineering Probability
   Engr 270, Basic Engineering Probability and Statistics

Students in the Field Program in Electrical Engineering may substitute EE 310 for Engr 260. Students in the Field Program in Engineering Physics may substitute EE 310 or Mathematics 471 for Engr 260. Students in the Field Program in Civil Engineering may substitute CEE 304 for Engr 270.

5) Electrical sciences
   Engr 210, Introduction to Electrical Systems
   Engr 264, Computerized-Instrumentation Design

6) Thermodynamics and energy balances
   Engr 219, Mass and Energy Balances
   Engr 221, Thermodynamics

Students in the Field Program in Electrical Engineering may substitute EE 480 for Engr 221.

7) Earth and life sciences
   Engr 201, Introduction to the Physics and Chemistry of the Earth

8) Introduction to engineering
   Several courses are offered to introduce freshmen to the various fields of engineering. Some of these courses, which begin with Engr 110, may not be included in this Announcement. A full listing will be available in the Course and Room Roster at the time of registration.

Humanities and Social Sciences
The six required courses in the humanities and social sciences must be chosen from approved courses in three categories: (a) humanities or history, (b) social sciences, and (c) expressive or language arts. The contents of these categories are listed below. At least three courses must be chosen from category (a), and no more than one course may be chosen from category (c). Each student must take at least one advanced course. (A course is considered advanced if it has as a prerequisite some other course in the same field or if it is numbered 300 or above.)

This policy applies to all members of the class of 1989 who have not completed their humanities and social sciences requirement by June 1987, and to all subsequent classes.

a) Humanities or History
   This category includes all courses designated by the College of Arts and Sciences as humanities and history (see p. 97, group 2b and group 3a; disregard the phrase "Any two") as well as the following:
   History of Art: all courses numbered 200 and above
   Music: all courses listed under "Music" (except 122), music, theory, and music history
   Theater Arts: only history, literature, and theory courses; performance courses are not acceptable

b) Social Sciences
   This category includes all courses designated by the College of Arts and Sciences as social sciences (see p. 97, group 2a) as well as the following:
   College of Agriculture and Life Sciences: Agricultural Economics 150, 250, 332; Communication 116, 120, 314, 204, 418; Education 110, 271, 317; Natural Resources 201, 407; Rural Sociology, all courses
   College of Architecture, Art, and Planning: Architecture 181, 182, 584; City and Regional Planning 400, 404, 413, 414
   College of Arts and Sciences: Economics, all courses except 317, 318, 319, 320
   College of Engineering: Civil and Environmental Engineering 321, 322, 325; Computer Science 305; Mechanical and Aerospace Engineering 302; School of Hotel Administration 111-281, 282
   College of Human Ecology: Consumer Economics and Housing 110, 111, 148, 247, 355; Human Development and Family Studies, all courses except 141, 242, 243, 348; Human Services Studies, all courses
   School of Industrial and Labor Relations: all courses except those in economic and social statistics

Division of Nutritional Sciences: 115

c) Expressive or Language Arts
   This category includes all courses defined by the College of Arts and Sciences as expressive arts (see p. 98, group 3b) as well as the following:
   College of Agriculture and Life Sciences: Communication, all courses, Floriculture 111
   College of Architecture, Art, and Planning: Art, all courses
   College of Arts and Sciences: all nonliterature courses and all music and theater arts courses that emphasize performance, acting, producing, or directing
   College of Human Ecology: Design and Environmental Analysis 101, 111, 115

Electives
There are three kinds of electives: approved, free, and technical. Approved electives must be an appropriate part of an overall educational plan or objective.* This constraint allows flexibility for individual goals while maintaining a coordinated, nontrivial program. A free elective may be chosen from the university if although all course selections must be approved by the student's faculty adviser. Technical electives are generally taken in the junior and senior years. They are usually upper-level courses in engineering, mathematics, or the physical sciences, but they also may be courses in other areas as designated by the student's field program.

*No ROTC courses may be used as approved electives unless they are colisted by an academic department.

Office of Admissions and Undergraduate Affairs
From the time that students enter the college as freshmen until they become affiliated with a major field or the College Program, they are under the administration of the Office of Admissions and Undergraduate Affairs, which implements the academic policies of the Common Curriculum Governing Board.

The office also offers student counseling services, publishes a college newsletter, maintains files on scholarships, and provides support for all students in the college.

To remain in good standing, students in the College of Engineering must affiliate with a field by the end of their sophomore year, but some fields permit (and encourage) affiliation at the beginning of the sophomore year. Transfer students affiliate with a field of study upon matriculation.

Engineering courses taken at the freshman and sophomore levels are listed under "Engineering Common Courses.

Following is a typical curriculum for freshmen who have not received advanced placement in mathematics. Many variations are possible, depending on the individual student's background, advanced placement credit, and career goals. Those acquainted with calculus may take Physics 112 in term one. Students with an interest in bioengineering may take biology in terms one and two as approved electives. Students preparing to study medicine should take one year of biology and Chemistry 208 in the first year.

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 191 or 193, Calculus for Engineers</td>
<td>4</td>
</tr>
<tr>
<td>Chem 207, General Chemistry</td>
<td>4</td>
</tr>
<tr>
<td>Engr 100, Introduction to Computer Programming</td>
<td>4</td>
</tr>
<tr>
<td>Introduction to Engineering, a humanities or social science course, or an approved elective</td>
<td>3</td>
</tr>
<tr>
<td>Freshman writing seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Term 2</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 192, Calculus for Engineers</td>
<td>4</td>
</tr>
<tr>
<td>Phys 112, Mechanics and Heat</td>
<td>4</td>
</tr>
<tr>
<td>Two electives</td>
<td>6 to 8</td>
</tr>
<tr>
<td>Freshman writing seminar</td>
<td>3</td>
</tr>
</tbody>
</table>

Field Program
The specific program for each field is described in the following pages. Students with a grade-point average of at least 2.0 who are making normal progress toward their degree may apply to enroll in a field program at the beginning or end of their sophomore year.

Students intending to enter the Field Program in Chemical Engineering should take Chemistry 208 and Chemistry 287-299 as approved electives in terms two and three, and Chemistry 288-290 as a field course in term four.

Students intending to major in mechanical engineering must take Engr 203, and students in agricultural engineering must take Engr 221 as a field course in term three or four. Technical engineering students should also complete Engr 221 in their sophomore year.

Some fields require a specific engineering distribution course as a prerequisite for the upperclass course sequence. These requirements are:
College Program

Individually arranged courses of study under the College Program are possible for those whose educational objectives cannot be met by one of the regular field programs. Often the desired curriculum is in an interdisciplinary area. Each program is developed by the student in consultation with faculty advisers and must be approved by the College Program Committee, which is responsible for supervising the student's work.

Students apply to enter the College Program early in the second term of the sophomore year. A student should seek assistance in developing a coherent program from professors in the proposed major and minor subject areas. If approved, the program is the curricular contract to which the student must adhere.

Every curriculum in the College Program, with the exception of certain faculty-sponsored programs, must comprise an engineering major and a minor. The major may be in any subject area offered by schools or departments of the college; the minor may be in a second engineering subject area or in a logically connected nonengineering area. The combinations must clearly form an engineering education in scope and in substance and should include engineering design and synthesis as well as engineering sciences. In addition to 40 credits in the major and minor subjects, including at least 21 credits in engineering courses, each program includes courses in humanities and social sciences and free electives.

Further information about the College Program may be obtained from the Office of Admissions and Undergraduate Affairs, 167 Olin Hall.

Dual Degree Option

A special academic option, intended for superior students, is the dual degree program, in which both Bachelor of Science and Bachelor of Arts degrees can be earned in five years. Students registered in either the College of Engineering or the College of Arts and Sciences may apply and, after acceptance of their application, begin the dual program in their second or third year. Those interested should contact the Office of Admissions and Undergraduate Affairs, 167 Olin Hall.

Double Major

Another program that is attractive to many students is the double major. This option, which makes it possible to develop expertise in two allied fields, generally requires at least one semester beyond the usual four years. Students affiliate with one field in the normal way and then apply for entrance into a second field before the end of their junior year. All the requirements of both fields must be satisfied. Further information is available from the Office of Admissions and Undergraduate Affairs, 167 Olin Hall.

Engineering Cooperative Program

A special program for undergraduates in most fields of engineering is the Engineering Cooperative Program, which provides an opportunity for students to gain practical experience in industry and other engineering-related enterprises before they graduate. By supplementing course work with carefully monitored paid jobs, co-op students are able to explore their own interests and acquire a better understanding of engineering as a profession.

Sophomores in the upper half of their class are eligible to apply for the co-op program. (Students in computer science and agricultural engineering are eligible, even though they may not be registered in the College of Engineering.) Applicants are interviewed by representatives of cooperating companies and select their work assignments from any offers they receive. Those students who are offered assignments and elect to join the program usually take their fifth-term courses at Cornell during the summer following their sophomore year and begin their first co-op work assignment that fall. They return to Cornell to complete term six with their classmates and then undertake a second work assignment with the same company the following summer. Co-op students return to campus for their senior year and graduate with their class.

Further information may be obtained from the Engineering Cooperative Program office, 105 Hollister Hall.

Master of Engineering Degree Programs

One-year Master of Engineering (M.Eng.) programs are offered in eleven fields. These programs are discussed in this Announcement in connection with the corresponding upperclass engineering field programs because the curricula are integrated. Cornell baccalaureate engineering graduates frequently continue their studies in the M.Eng. program, although the program is also open to qualified graduates of other schools. The eleven M.Eng. degrees and the academic areas under which they are described are listed below:

- M.Eng.(Aerospace): Mechanical and aerospace engineering
- M.Eng.(Agricultural): Agricultural engineering
- M.Eng.(Chemical): Chemical engineering
- M.Eng.(Civil): Civil and environmental engineering
- M.Eng.(Computer Science): Computer science
- M.Eng.(Electrical): Electrical engineering
- M.Eng.(Engineering Physics): Applied and engineering physics
- M.Eng.(Materials): Materials science and engineering
- M.Eng.(Mechanical): Mechanical and aerospace engineering
- M.Eng.(Nuclear): Nuclear science and engineering
- M.Eng.(OR&IE): Operations research and industrial engineering

A new program allows candidates for a professional master's degree to specialize in manufacturing systems engineering. This specialization, which is attested to by a Dean's Certificate at the time of graduation, may be centered in any one of the fields listed above.

Cornell engineering graduates in the upper half of their class will generally be admitted to M.Eng. programs; however, requirements for admission vary by field. Superior applicants who will be, at the time of matriculation, eight or fewer credits short of a baccalaureate degree in engineering, may petition for early admission. Other applicants must have a baccalaureate degree or its equivalent from a college or university of recognized standing, in an area of engineering or science that is judged appropriate for the proposed field of study. They must also present evidence of undergraduate preparation equivalent to that provided by a Cornell undergraduate engineering education, a transcript, two letters of recommendation, and a statement of academic purpose. A candidate who is admitted with its equivalent from a college or university of recognized standing, in an area of engineering or science that is judged appropriate for the proposed field of study. They must also present evidence of undergraduate preparation equivalent to that provided by a Cornell undergraduate engineering education, a transcript, two letters of recommendation, and a statement of academic purpose. A candidate who is admitted with an undergraduate background that is judged adequate must make up any deficiencies in addition to fulfilling the regular course requirements for the degree. Applicants from foreign universities must submit the results of the Graduate Record Examinations aptitude tests and must have an adequate command of the English language. Limited financial aid based on merit is available for superior applicants. Some industry-sponsored traineeships, which extend the program to two years, are available. Application forms and further information are available from the Office of the Graduate Professional Programs Committee, 109 Hollister Hall.

Cooperative Programs with the Johnson Graduate School of Management

Two programs culminate in both Master of Engineering and Master of Business Administration degrees. One, which students enter during their undergraduate career, makes it possible to earn the B.S., M.Eng., and M.B.A. in six years—one year less than such a program would normally require. The other program, which is available to students who already hold baccalaureate degrees from Cornell or other institutions, requires five semesters and leads to both the M.Eng. and M.B.A.

Undergraduate students interested in the six-year program should seek advice and information from the department with whose field they intend to affiliate during their upperclass years. Further information about admission to either program and about special scholarship aid may be obtained from the Graduate Professional Programs Committee, 109 Hollister Hall.

Academic Procedures and Policies

Advanced Placement Credit

The College of Engineering awards a significant amount of advanced placement (AP) credit to entering freshmen who demonstrate proficiency in the subject areas of introductory courses. Students may qualify for AP credit in one of two ways:

1) by receiving sufficiently high scores on advanced placement examinations given and scored by the College Entrance Examination Board (CEEB); or
2) by receiving sufficiently high scores on Cornell's departmental placement examinations, which are given during orientation week before fall-term classes begin. Advanced placement is granted only to first-term freshmen, and the placement examinations are scored before the students begin classes.

Advanced placement credit is intended to permit students to develop more challenging and stimulating programs of study. Students who receive AP credit for an introductory course may use it in three different ways:

1) They may enroll in a more advanced course in the same subject right away.
2) They may substitute an elective course from a different area.
3) They may enroll in fewer courses, using the AP credit to fulfill basic requirements.

A detailed description of the college's policies concerning advanced placement credit and its use in developing undergraduate programs may be found in the pamphlet Rules Governing Advanced Placement and Transfer Credit for Freshman Engineering Students, which may be obtained at the Office of Admissions and Undergraduate Affairs, 167 Olin Hall.

Transfer credit

Entering freshmen and entering transfer students who have completed courses at recognized and accredited colleges may, under certain conditions, have credits for such courses transferred to Cornell. Such courses must represent academic work in excess of that required for the secondary school diploma.

College courses completed under the auspices of cooperative college--high school programs may be considered for an exception to these general policies.
concerning advanced standing. Credit for such courses is recorded only if the student demonstrates academic proficiency by taking the appropriate CEEB or Cornell departmental placement examination, as described above.

After matriculation, no more than 9 credits of transfer or Cornell extramural credit may be used to satisfy bachelor's degree requirements. A more detailed description of the college's regulations governing transfer credit may be found in the College of Engineering Handbook, available from the Office of Admissions and Undergraduate Affairs, 167 Cull Hall.

Academic Standing

The requirements for good standing in the college vary slightly among the different divisions. Freshmen must have a grade-point average of 1.7 or higher with no failing, unsatisfactory, or incomplete grades and must be making adequate progress toward the four-year degree. Sophomore requirements are the same, except that the grade-point average must be at least 2.0. Upperclass requirements for good standing and for satisfactory performance in courses that are prerequisite for further courses vary slightly for different fields of study, as specified in the following sections.

Dean's List citations are presented each semester to engineering students with exemplary academic records. The criteria for this honor, which are determined by the dean of the college, are a term average of 3.25 or higher with no failing, unsatisfactory, or incomplete grades (even in physical education) and 12 credits or more of letter grades. Students may earn Dean's List status retroactively if they meet these criteria after making up incompletes.

Standard of Performance for Mathematics

Every student must attain a grade of at least C- in Mathematics 192, 293, and 294, or other courses that may be approved as substitutes for these courses. If this requirement is not met the first time a course is taken, the course must be repeated and a satisfactory grade attained before the next course in the sequence may be taken. Courses that are taken a second time in order to meet this requirement do not yield additional credit toward a degree.

S-U Grades

The option of receiving a grade of "satisfactory" or "unsatisfactory" (S-U) in a particular course, rather than a grade on a graduated scale, may be selected only in the following circumstances. Students who want to take a course on an S-U basis must have completed at least one full semester of study at Cornell, and they may take only one S-U course at a time. Only courses in the humanities and social sciences, approved electives, and free electives may be taken as S-U courses. To exercise the S-U option or change a grading option, an add/drop form signed by the instructor of the course in question and the student's faculty adviser must be filed with the registrar of the college.

Students who are not enrolled at Cornell as full-time students may be making adequate progress toward the Extramural Division. No more than 9 credits earned through study in the Extramural Division or acquired as transfer credit may be used to satisfy the requirements for the bachelor's degree in engineering. Degree candidates may spend periods of time studying away from the Cornell campus with appropriate authorization. Such students must register for study in absentia and pay a fee. Information on programs sponsored by other universities and on procedures for direct enrollment in foreign universities is available at the Cornell Abroad Office in 170 Uris Hall. Programs should be planned in consultation with the staff of the Office of Admissions and Undergraduate Affairs, who can provide information on credit evaluation policies and assist in the petitioning process.

Leave of Absence and Withdrawal

Students may interrupt their studies for a period of time by taking a leave of absence. A formal petition must be filed, an exit interview conducted, and written approval granted. Leaves of absence for more than two years are not generally granted. Credit earned while on leave of absence is subject to the limitation placed on extramural and study-abroad fees. Students who voluntarily withdraw from the engineering degree program sever all connection with the college and if they subsequently want to return, they must make a formal application for readmission. Students who fail to register in the first three weeks of the semester, without having received a leave of absence or permission for study in absentia, may be classified, by action of the faculty, as having withdrawn.

Engineering Job Placement

Advising is available for students who desire assistance in career and job-search matters. Also, interviews are arranged between students and company representatives who visit the campus to recruit employees. This service, which is available to both undergraduates and graduates, can be used to find permanent or summer employment. Further information is available from the Office of Engineering Placement on the second floor of Carpenter Hall.

Agricultural Engineering


Bachelor of Science Curriculum

The Field Program in Agricultural Engineering prepares students for successful practice by using engineering principles to solve problems in the agricultural sector of our economy. Such problems include production, storage, processing, distribution, and issues of environmental quality and safety; an emerging area involves engineering aspects of the development of biotechnology. Biological, social, and agricultural sciences are integrated into the field program. Students are encouraged to develop a concentration in an area of interest during their junior and senior years. Students in agricultural engineering are enrolled in the College of Agriculture and Life Sciences during their freshman and sophomore years and jointly enrolled in that college and the College of Engineering in the junior and senior years having College of Engineering tuition in the junior year.

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Bachelor of Science Curriculum

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For further details see the department's undergraduate programs brochure, available at 106 Filley-Robb Hall.

The field program requirements are outlined below.

Basic Subjects

Credits
Math 191, 192, 293, 294, Calculus for Engineers and Engineering Mathematics 16
Chem 207 General Chemistry 4
Phys 112, 213, 214, Physics I, II, and III 12
Introductory biological sciences 6
Ag En 151, 152, computer programming and computer graphics 4
Engineering distribution (four courses, including Mechanics of Solids and Thermodynamics) 12
Humanities and social sciences (eight courses, including two in written expression, one in oral expression, and a minimum of 9 credits in humanities) 24

Advanced and Applied Subjects

Engineering sciences (must include Fluid Mechanics and Dynamics, Ag En 250, and four agricultural engineering courses at least 12 credits, chosen from courses 350 to 399 and above 450 but excluding seminars and special-problems courses 33
Biological or agricultural sciences (3 credits of biological sciences required) 12
Free electives 6

Master of Engineering (Agricultural) Degree Program

The program for the M.Eng (Agricultural) degree is intended primarily for those students who plan to enter engineering practice. The curriculum is planned as an extension of the Cornell undergraduate program in agricultural engineering but can accommodate graduates of other engineering programs. The curriculum consists of 30 credits of courses intended to strengthen the students' fundamental knowledge of engineering and develop their design skills. Six of the required 30 credits are earned for an engineering design project that culminates in a professional-level report.

A candidate for the M.Eng (Agricultural) degree may choose to concentrate in one of the subareas of agricultural engineering or take a broad program without specialization. The subareas are (a) power and machinery, (b) soils and water engineering, (c) agricultural structural and associated systems, (d) electric power and processing, (e) energy management, (f) agricultural waste management, (g) bioengineering, (h) secondary-road design and construction, and (i) food engineering. Engineering electives are chosen from among subject areas relevant to agricultural engineering, such as thermal engineering, mechanical design and analysis, theoretical and applied mechanics, structural engineering, hydraulic, environmental engineering, soil engineering, waste management, and electronics.

Applied and Engineering Physics


The undergraduate engineering physics curriculum is designed for students who want to pursue careers in research or development in applied science or advanced technology. Its distinguishing feature is a focus on the fundamentals of physics, both experimental and theoretical, that have a broad applicability in engineering and science.
The industrial demand for baccalaureate graduates is high, and many students go directly to industrial positions where they work in a variety of areas, including bioengineering, computer technology, electronic-circuit design, energy conversion, geological analysis, high-voltage design, laser technology, microelectronic technology, nuclear technology, plasma physics, power engineering, and solid-state-device development. Other graduates go on for advanced study in fields such as astrophysics, atmospheric sciences, biochemistry, computer science, condensed-matter physics, energy conversion, environmental science, geophysics, laser optics, materials science and engineering, nuclear engineering, oceanography, plasma physics, solid-state electronics, and statistical physics.

The undergraduate program can also serve as an excellent preparation for medical school, business school, or specialization in patent law.

The engineering physics program fosters this breadth of opportunity because it both stresses the fundamentals of science and engineering and gives the student direct exposure to the application of these fundamentals. Laboratory experimentation is emphasized as an example of the continuing innovation of design is provided. Examples are A&EP 110, The Laser and Its Applications in Science, Technology, and Medicine (a freshman course); A&EP 264, Computerized Design (a sophomore course); A&EP 363, Electronic Circuits (a junior course); and Physics 410, Advanced Experimental Physics (a senior course).

Undergraduates who plan to enter the Field Program in Engineering Physics are advised to arrange their Common Curriculum with certain requirements and recommendations in mind. They are encouraged to take Physics 112 during their first semester, and they are required to take Engr 221 (Thermodynamics), as an engineering distribution course. Students are encouraged to satisfy the computing applications requirement with an engineering distribution course, and A&EP 264 is recommended. Engineering physics students need to take only three engineering distribution courses, as A&EP 333, which they take in their junior year, counts as a fourth member of this category.

Students who want to receive the Baccalaureate degree must satisfy the requirements of the field program, outlined above, as well as the requirements of the Common Curriculum.

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>A&amp;EP 333, Mechanics of Particles and Solid Bodies</td>
<td>3</td>
</tr>
<tr>
<td>A&amp;EP 355, Intermediate Electromagnetism</td>
<td>4</td>
</tr>
<tr>
<td>A&amp;EP 356, Intermediate Electrodynamics</td>
<td>4</td>
</tr>
<tr>
<td>A&amp;EP 361, Introductory Quantum Mechanics</td>
<td>4</td>
</tr>
<tr>
<td>A&amp;EP 363, Electronic Circuits</td>
<td>4</td>
</tr>
<tr>
<td>A&amp;EP 423, Statistical Thermodynamics</td>
<td>4</td>
</tr>
<tr>
<td>A&amp;EP 434, Continuum Physics</td>
<td>4</td>
</tr>
<tr>
<td>Physics 410, Advanced Experimental Physics</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics 421 or T&amp;AM 610 (applied mathematics)</td>
<td>4</td>
</tr>
<tr>
<td>Mathematics 422 or T&amp;AM 611 (applied mathematics)</td>
<td>4</td>
</tr>
<tr>
<td>Applications of quantum mechanics*</td>
<td>3 or 4</td>
</tr>
</tbody>
</table>

Some courses at the senior level are recommended. Students who have majored in mathematics or engineering will find it useful to provide a combination of a good general background in the mathematics required by the department and an opportunity to explore upper-level and graduate courses. Various programs are described in a special section of the Undergraduate Bulletin available from the School of Applied and Engineering Physics, Clark Hall. Students interested in such programs are advised to consult with a professor active in their area or with the associate director of the school, Professor M. S. Nelkin.

Master of Engineering (Engineering Physics) Degree Program

The M.Eng. (Engineering Physics) degree may lead directly to employment in engineering design and development or may be a basis for further graduate work. Students have the opportunity to join an upperclass program to develop areas of concentration in accordance with their individual interests. For those who look toward an industrial position after graduation, these electives can be chosen to provide the necessary background in practical engineering. An area of concentration might be developed, for example, in digital-circuit design and fabrication. A different set of electives could be selected as preparation for medical, law, or business school. Students who plan on graduate work, the electives provide an excellent opportunity to explore upper-level and graduate courses. Various programs are described in a special section of the Undergraduate Bulletin available from the School of Applied and Engineering Physics, Clark Hall. Students interested in such programs are advised to consult with a professor active in their area or with the associate director of the school, Professor M. S. Nelkin.

One example of a specific area of study is solid-state physics and chemistry as applied to microstructure science. Core courses in this specialty include the microcharacterization of electronic materials and the fabrication of microstructures and devices. The design project may focus on semiconductor materials, device physics, or microstructure science. A wide latitude is allowed in the choice of the required design project.

The Center for Applied Mathematics administers a broadly based interdisciplinary graduate program that provides opportunities for study and research in a wide range of the mathematical sciences. This program begins with a solid foundation in analysis, algebra, and methods of applied mathematics. Individual graduate students design the remainder of their program in consultation with their Special Committee. For detailed information on opportunities for graduate study in applied mathematics, contact the director of the Center for Applied Mathematics, Sage Hall.

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

A list of selected graduate courses in applied mathematics may be found in the description of the Center for Applied Mathematics, in the section "Interdisciplinary Centers and Programs."

Chemical Engineering

Bachelor of Science Curriculum

The undergraduate Field Program in Chemical Engineering comprises a coordinated sequence of courses beginning in the sophomore year and extending through the fourth year. Special programs in biochemical engineering and polymeric materials are available. Students who plan to enter the field program take Chemistry 208 as an approved elective during the freshman year. The program for the last three years, for students who have taken two engineering distribution courses during the first year, is as follows:

**Term 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 293, Engineering Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>Phys 223, Electricity and Magnetism</td>
<td>4</td>
</tr>
<tr>
<td>Chem 287–289, Physical Chemistry (approved elective)</td>
<td>5</td>
</tr>
<tr>
<td>Chem E 2E9 (engineering distribution course)</td>
<td>3</td>
</tr>
<tr>
<td>Humanities or social sciences course</td>
<td>3</td>
</tr>
</tbody>
</table>

**Term 4**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Math 294, Engineering Mathematics</td>
<td>4</td>
</tr>
<tr>
<td>Phys 214, Optics, Waves, and Particles</td>
<td>4</td>
</tr>
<tr>
<td>Chem 288–290, Physical Chemistry</td>
<td>5</td>
</tr>
<tr>
<td>Engineering distribution course</td>
<td>3</td>
</tr>
<tr>
<td>Humanities or social sciences course</td>
<td>3</td>
</tr>
</tbody>
</table>

**Term 5**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 357, Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>Chem 251, Organic Chemistry Laboratory</td>
<td>2</td>
</tr>
<tr>
<td>Chem E 313, Chemical Engineering Thermo.</td>
<td>4</td>
</tr>
<tr>
<td>Chem E 323, Fluid Mechanics</td>
<td>3</td>
</tr>
</tbody>
</table>

**Term 6**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem 358, Organic Chemistry</td>
<td>3</td>
</tr>
<tr>
<td>Chem E 101, Nonresident Lectures</td>
<td>0</td>
</tr>
<tr>
<td>Chem E 324, Heat and Mass Transfer</td>
<td>3</td>
</tr>
<tr>
<td>Chem E 332, Analysis of Separation Processes</td>
<td>4</td>
</tr>
<tr>
<td>Chem E 390, Reaction Kinetics and Reactor</td>
<td>3</td>
</tr>
<tr>
<td>Design</td>
<td>3</td>
</tr>
</tbody>
</table>

**Term 7**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem E 432, Chemical Engineering Laboratory</td>
<td>4</td>
</tr>
<tr>
<td>Chem E process or systems elective‡</td>
<td>3</td>
</tr>
<tr>
<td>Electives*</td>
<td>6</td>
</tr>
<tr>
<td>Humanities or social sciences course</td>
<td>3</td>
</tr>
</tbody>
</table>

**Term 8**

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chem E 462, Chemical Process Design</td>
<td>4</td>
</tr>
<tr>
<td>Chem E 472, Process Control</td>
<td>3</td>
</tr>
<tr>
<td>Electives*</td>
<td>6</td>
</tr>
<tr>
<td>Humanities or social sciences course</td>
<td>3</td>
</tr>
</tbody>
</table>

*The electives in terms seven and eight comprise 6 credits of technical electives and 6 credits of free electives.

**Chemistry 253 plus an applied science elective may be substituted for Chem 357–358. Applied science electives include Biological Sciences 330 and 331, Principles of Biochemistry; Chem E 640, Polymeric Materials; Chem E 673, Adsorption and Catalysis; MSE 321, Structure and Properties of Materials; MSE & 332, Electrical and Magnetic Properties of Materials; MSE & 441, Microprocessing of Materials; Microbiology 290, General Microbiology Lectures; any A&PE course numbered 333 or above; any Chemistry course numbered 301 or above; any Physics course numbered 300 or above.

**The M.Eng.(Civil) degree program is designed to prepare students for professional practice in civil and environmental engineering. Requirements include an additional 3 credits of approved course offerings in fields related to the general ones for the degree (see the introductory section under College of Engineering), include three required courses: one in professional engineering practice (CEE 503) and two in design (CEE 501 and 502). The design sequence requires the completion of a project involving synthesis, analysis, decision making, and application of engineering judgment; normally it includes an intensive, full-time, three-week session between semesters.

**Students in Civil Engineering may use CEE 304 as a substitute for Engr 270, applying it toward the Engineering Distribution Requirement. If this is done, the technical elective requirement is increased by 3 credits. Alternatively, Engr 270 may be accepted (on petition) as a substitute for CEE 304 in the field program, but only if Engr 270 is taken before entry into the field.**

Master of Engineering (Civil Degree Program)

The M.Eng. (Civil) degree program is designed to prepare students for professional practice in civil and environmental engineering. Requirements include an additional 3 credits of approved course offerings in fields related to the general ones for the degree (see the introductory section under College of Engineering), include three required courses: one in professional engineering practice (CEE 503) and two in design (CEE 501 and 502). The design sequence requires the completion of a project involving synthesis, analysis, decision making, and application of engineering judgment; normally it includes an intensive, full-time, three-week session between semesters.

**Students in Civil Engineering may use CEE 304 as a substitute for Engr 270, applying it toward the Engineering Distribution Requirement. If this is done, the technical elective requirement is increased by 3 credits. Alternatively, Engr 270 may be accepted (on petition) as a substitute for CEE 304 in the field program, but only if Engr 270 is taken before entry into the field.**

Bachelor of Science Curriculum

The School of Civil and Environmental Engineering offers an accredited undergraduate program in civil engineering. The school contains two departments, and undergraduate electives can be arranged in a number of subject areas. The Department of Structural Engineering offers instruction in analysis, behavior, and design of structures; structural materials; and geotechnical engineering. Within the Department of Environmental Engineering there are five subject areas: environmental and public systems, environmental quality engineering, fluid mechanics and hydrology, remote sensing, and transportation.

Students planning to enter the Field Program in Civil Engineering are required to take Mechanics of Solids (Engr 202) during the sophomore year. Prospective majors are strongly encouraged to obtain a “typical course schedule” from the school office.

For the Field Program in Civil Engineering the following courses are required in addition to those required for the Common Curriculum:

- **Courses**
  - Engr 202, Mechanics of Solids*  
  - Engr 203, Dynamics
  - Engr 261, Introduction to Mechanical Properties of Materials*  
  - CEE 241, Engineering Computation‡  
  - CEE 304, Uncertainty Analysis in Engineering**  
  - CEE 323, Engineering Economics and Systems Analysis  
  - CEE 331, Fluid Mechanics I  
  - CEE 341, Introductory Soil Mechanics  
  - CEE 351, Environmental Quality Engineering  
  - CEE 361, Introduction to Transportation Engineering  
  - CEE 371, Structural Behavior  
  - CEE distribution courses (four courses selected from four of the seven different subject areas of CEE)

*These courses can also be used to satisfy the Common Curriculum requirements for engineering distribution courses.

†Chem 208 can be substituted for Phys 214.

‡Engr 241 can be used to satisfy both the computer application requirement and an engineering distribution requirement of the Common Curriculum.
Course Work Credits

Theory sequence 8
Numerical Analysis 3 or 4
Electrical Engineering 3

Science is reviewed each term. To remain in good standing with the department, they must have an overall term average of at least 2.3 with no courses failed and a term average for field program courses of at least 2.7 with no course grade less than C-.

Cooperative Program with the Johnson Graduate School of Management

Undergraduates majoring in computer science may be interested in a program that can lead, in the course of six years, to B.S., M.Eng (Computer Science), and M.B.A. degrees. This program, which is sponsored jointly by the College of Engineering and the Johnson Graduate School of Management, enables students to study several subjects required for the M.B.A. degree as part of their undergraduate curriculum. Planning must begin early, however, if all requirements are to be completed on schedule.

Further details, application forms, and assistance in planning a curriculum, students should contact the computer science undergraduate coordinator in Upson Hall.

Master of Engineering (Computer Science) Degree Program

The one-year program leading to the degree of M.Eng (Computer Science) is very small; from two to five students a year are admitted. Admission standards are the same as those applied to doctoral candidates. A good undergraduate background in mathematics or computer science is required. In the curriculum the emphasis can be on computer science, on theory of algorithms and theory of counting, on numerical analysis, or on information processing, which includes databases and information organization and retrieval. Students who are interested in logical design or computer architecture will find it more appropriate to apply for admission to a graduate program in electrical engineering. The required design project could be, for example, the design of a compiler for a large subset of a general-purpose programming language.

Electrical Engineering

J. A. Nation, director; B. Nichols, associate director; V. Anantharam, J. M. Bailingy, T. Berger, A. Bojanczyk, R. Bolgiano, Jr., R. R. Capranica, H. J. Carlin, H.-D. Chiang, R. C. Compton


Bachelor of Science Curriculum

Reflecting the large scope of this engineering discipline, the undergraduate Field Program in Electrical Engineering provides a broad foundation in a number of important areas in addition to specialization in one or more.

Students can choose, for example, to concentrate in computer engineering, control systems; electronic circuit design; information, communications, and decision theory; microwave electronics; plasma physics; power and energy systems; quantum and optical electronics; radio and atmospheric physics; or semiconductor devices and applications.

In addition to courses taken to satisfy the Common Curriculum requirements, including EE 210, the electrical engineering Bachelor of Science curriculum requirements are as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 230, Introduction to Digital Systems</td>
<td>4</td>
</tr>
<tr>
<td>EE 301, Electrical Signals and Systems I</td>
<td>4</td>
</tr>
<tr>
<td>EE 302, Electrical Signals and Systems II</td>
<td>4</td>
</tr>
<tr>
<td>EE 303, Electromagnetic Theory I</td>
<td>4</td>
</tr>
<tr>
<td>EE 306, Fundamentals of Quantum and Solid-State Electronics</td>
<td>4</td>
</tr>
<tr>
<td>EE 315, Electrical Laboratory I</td>
<td>4</td>
</tr>
<tr>
<td>EE 316, Electrical Laboratory II</td>
<td>4</td>
</tr>
<tr>
<td>EE 304, Electromagnetic Theory II or EE 310, Probability and Random Signals</td>
<td>4</td>
</tr>
<tr>
<td>EE electives (2 courses)</td>
<td>8</td>
</tr>
</tbody>
</table>
| EE electives (2 courses) | 6 "Credits in excess of 46 may be used to fulfill approved, technical, or free elective requirements of the Common Curriculum.

Specialization is achieved through the four senior-year electrical engineering electives, which are selected from more than forty offerings of the school.

Students majoring in electrical engineering are expected to meet the following academic standards:

1) A grade-point average of at least 2.3 every semester
2) A grade of at least C— in each required or elective course in the field program and each course used as a technical elective.
3) Satisfactory progress in meeting the requirements for graduation, including completion of EE 301, 303, and 315 by the end of the first semester of the junior year and the accumulation of at least 14 credits each semester.

Master of Engineering (Electrical) Degree Program

The M.Eng (Electrical) degree prepares the student either for professional work in this area of engineering or for more advanced graduate study in a doctoral program. The M.Eng differs from the M.S. degree program mainly in its emphasis, which is on design capability rather than basic research. The 30-credit curriculum includes two two-term course sequences in electrical engineering, and the design project, which alone may account for 3 to 10 credits. General admission and degree requirements are described in the college's introductory section.

Geological Sciences


Bachelor of Science Curriculum

Study in geological sciences is offered for students who are preparing for careers in solid earth science, for those who want a broad background in the geological sciences as preparation for careers in other fields, and for those who want to combine geological training with other sciences such as agronomy, astronomy and space science, background sciences, chemistry, economics, mathematics, physics, or various fields of engineering. The Department of Geological Sciences is organized as an intercollegiate department in the College of Arts and Sciences and the College of Engineering. College of Arts and Sciences students should consult that college's section on geological sciences as well as the course listing following.

Students in the College of Engineering who plan to enter the Field Program in Geological Sciences are required to take Geol 201 (Engr 201) during their freshman or sophomore year. Those interested in geobiology should take Biological Sciences 101—103 and 102—104.

Geological Sciences requires six 300-level courses for the major: Geol 326, 356, 355, 375, 388, and one other 300- or 400-level course. A summer field geology course is also required.

Core courses may be taken in any reasonable sequence, except that Geol 355, which is offered in the fall, should be taken before Geol 356, which is offered in the spring. Geol 326 and 375 should be taken relatively early in the major program as preparation for the summer field camp, which usually follows the junior year. Students with adequate preparation may attend field camp at an earlier time.

It is recommended that students intending to specialize in geophysics select most of their approved and technical electives from the following courses or their equivalents:

A&EP 333, Mechanics of Particles and Solid Bodies
A&EP 355, Intermediate Electromagnetism
A&EP 356, Intermediate Electrodyamics
A&EP 434, Continuum Physics
Phys 410, Advanced Experimental Physics
T&AM 310—311, Advanced Engineering Analysis I and II

It is recommended that students intending to specialize in geochemistry (including petrology and mineralogy) select most of their approved and technical electives from the following courses or their equivalents:

Chem 206, General Chemistry
Chem 287—288, Introductory Physical Chemistry
Chem 300, Quantitative Chemistry
Chem 301, Experimental Chemistry I
Chem 302, Experimental Chemistry II
Chem 303, Experimental Chemistry III
Chem 357—358, Introductory Organic Chemistry
Chem 369—390, Physical Chemistry I and II
MME 331, Structural Characterization and Properties of Materials
MS&E 335, Thermodynamics of Condensed Systems

It is recommended that students intending to specialize in geobiology select most of their approved and technical electives from the following courses or their equivalents:

Bio S 241, Plant Biology
Bio S 274, The Vertebrates
Bio S 281, Genetics
Bio S 330—331, Principles of Biochemistry
Bio S 261, General Ecology
Bio S 448, Plant Evolution and the Fossil Record
Bio S 378, Organic Evolution
Chem 253, Elementary Organic Chemistry
It is recommended that students who want to pursue further or immediate employment in applied geology (environmental and engineering geology, hydrogeology, petroleum geology, or geological engineering) select most of their approved and technical electives from the following courses or their equivalents, with two of the four from the same field:

Agron 361, Geology, Classification, and Geography of Soils
Agron 667, Soil Physics
Agron 366, Soil Chemistry
CEE 341, Introductory Soil Mechanics
CEE 611, Remote Sensing Applications
CEE 612, Physical Environment Evaluation
ICE 615, Digital Image Processing
ICE 640, Foundation Engineering
MS&E 331, Structural Characterization and Properties of Materials
MS&E 445, Mechanical Properties of Materials
CEE 331, Fluid Mechanics
CEE 332, Hydraulic Engineering
CEE 351, Environmental Quality Engineering
CEE 633, Flow in Porous Media and Groundwater
OR&IE 260, Introductory Engineering Probability
OR&IE 370, Introduction to Statistical Theory with Engineering Applications

Students intending to specialize in economic geology or pursue careers in the mining industries or mineral exploration should consider including economics courses among their humanities and social sciences electives and should select most of the approved and technical electives from the groups of courses listed above for geochemistry and applied geology plus the following additional courses:

CEE 654, Aquatic Chemistry
CEE 741, Rock Engineering

Students who want a more general background or who want to remain uncommitted in regard to specialization must choose at least two of their three approved electives from the same field, at a level comparable to the courses listed above. The technical electives may be chosen from offerings in geological sciences or in other science or engineering fields and should be at the 300 level or above. Outstanding students may request substitution of Geol 491 and 492, Undergraduate Research, for a fourth-year technical elective.

Students intending to pursue graduate study in geology and who therefore must broaden their education inasmuch as to obtain credit for two technical electives, one approved and the other an elective. Both of these courses are prerequisites for courses listed above for geochemistry and applied geology plus the following additional courses:

CEE 640, Foundation Engineering
CEE 351, Environmental Quality Engineering
CEE 633, Flow in Porous Media and Groundwater
MS&E 331, Structural Characterization and Properties of Materials
MS&E 445, Mechanical Properties of Materials
MS&E 448, Materials Design Concepts I
MS&E 448, Materials Design Concepts II

*Research involvement gives undergraduates the opportunity to work with faculty members and their research projects. Each electives course is particularly well suited to broaden their engineering education.*

To continue in good standing in the Field of Materials Science and Engineering, students graduating in 1987 and 1988 must:

1) Maintain an overall 2.0 term average
2) Maintain an average of 2.0, with no grade below C, in the department's basic curriculum.

In addition,

1) Beginning with the class of 1987, students must maintain an average of 2.3, with no grade below C, in the department's basic curriculum.
2) Beginning with the class of 1988, students must maintain an overall term average of 2.0.
3) Beginning with the class of 1990, MS&E 261 or 262 must be completed before entering the field.

An attractive and very challenging program combines the materials science and engineering curriculum with that of either electrical engineering or chemical engineering, leading to a double major. The combination of materials science and engineering with electrical engineering is particularly well suited to students who will eventually be employed in the electronic materials industry. Mechanical engineers knowledgeable in materials science will be better equipped for technical careers. Curricula leading to the double-major degree must be approved by both of the departments involved. Students are urged to plan such curricula as early as possible.

**Master of Engineering (Materials) Degree Program**

Students who have completed a four-year undergraduate program in engineering or the physical sciences are eligible for admission to the M.Eng (Materials) program, which includes the following:

1) A project qualifying for at least 12 credits and requiring individual effort and initiative. This project, carried out under the supervision of a member of the faculty, is usually experimental, although it can be analytical.

2) Six credits of courses in mathematics or applied mathematics. This requirement may be satisfied by courses T&AM 310 and 311, students who have previously completed these must select other courses acceptable to the faculty.

3) Courses in materials science and engineering selected from any of those offered at the graduate level or engineering distribution course. They also require to bring the total credits to 30.

General admission and degree requirements are described in the introductory section under College of Engineering.

**Mechanical and Aerospace Engineering**


Members of the faculty of the graduate Fields of Aerospace Engineering and Mechanical Engineering are listed in the Announcement of the Graduate School.

**Bachelor of Science Curriculum in Mechanical Engineering**

The upperclass Field Program in Mechanical Engineering is designed to provide a broad background in the fundamentals of this discipline as well as to offer an introduction to the many professional and technical areas with which mechanical engineers are concerned. Two main areas of concentration, corresponding to the two major streams of mechanical engineering technology, are offered in the field program.

Mechanical systems, design, and manufacturing is concerned with the design, assembly, testing, and manufacture of machinery, vehicles, devices, and systems. Particular areas of concentration include mechanical design and analysis, computer-aided design, vehicle engineering, composite materials, vibrations and control systems, biomechanics, and manufacturing engineering.

Engineering of fluids, energy, and heat-transfer systems has as its main emphasis the experimental and theoretical aspects of fluid flow and heat transfer, the development of fossil, solar, and other energy sources for uses such as electric-power generation; industrial heating; terrestrial and aerospace transportation; and the use of heating, air conditioning, refrigeration, and noise- and pollution-control techniques to modify the human environment.

The undergraduate field program is a coordinated sequence of courses beginning in the sophomore year. During that year students who plan to enter the field of mechanical engineering take Engr 202 (also T&AM 202) as an engineering distribution course. They also take Engr 203 (also T&AM 203) which is a field requirement that may simultaneously satisfy Common Curriculum requirements as an approved (or free) elective. Both of these courses are prerequisites for courses to be taken during the junior year. During either the sophomore or junior year students take Engr 221 (also M&AE 221) and Engr 261 (also MS&E 261).

The requirements for the degree of Bachelor of Science in mechanical engineering are as follows:

1) Completion of the Common Curriculum. During the upperclass years this will typically mean earning credit for two technical electives, one approved elective, two free electives, and three humanities or social sciences courses.

2) Completion of the field requirements, which consist of ten required courses (beyond Engr 202 and 203, already mentioned), and three elective courses (9 credits). The ten additional required courses are
Preparation in Aerospace Engineering

Although there is no separate undergraduate program in aerospace engineering, students may prepare for a career in this area by majoring in mechanical engineering and taking a number of aeronautical engineering electives such as M&E 405, 506, 507, 530, 531, and 536. Students may prepare for the graduate program in aerospace engineering by majoring in mechanical engineering in other engineering specialties such as electrical engineering or engineering physics, or in the physical sciences. Other subjects recommended as preparation for graduate study include thermodynamics, fluid mechanics, applied mathematics, chemistry, and physics.

Master of Engineering (Aerospace) Degree Program

The M.Eng (Aerospace) program is designed to increase the student’s facility in the application of the basic sciences to important practical problems. Because aerospace engineering is continually engaged in new areas, an essential guideline for the program is to train beyond present-day practices and techniques. This is achieved by supplying the student with the fundamental background and the analytical techniques that will remain useful in all modern engineering developments.

General admission and degree requirements are described in the introductory section under College of Engineering.

The three elective courses consist of one approved distribution course, the corresponding field elective, and a major consisting of a minimum of 12 credits, and two field electives (6 credits). These electives are chosen from lists approved by the faculty of the Sibley School of Mechanical and Aerospace Engineering.

An additional graduation requirement of the field program is proof of elementary competence in technical drawing. This proof may be given in a number of ways, including satisfactory completion of (a) a technical drawing course in high school or in a community college, (b) Engineering 102, Drawing and Design Engineering, (c) another technical drawing course at Cornell, or (d) a special examination. The proof is expected before completion of M&E 325, Mechanical Design and Analysis. An additional requirement, starting with the class of 1989, is that one of the electives must be a design course chosen from a list designated by the faculty. The computer applications requirement of the Common Curriculum may be satisfied by several courses, including M&E 489, 575, and 670.

The requirements listed are those now in effect for the classes of 1989 and subsequent years and are subject to change by the faculty of the school. Requirements for earlier classes differ somewhat from the ones listed.

Introduction to Electrical Systems (EE 210) may be replaced or supplemented by Introductory Electronics (Physics 360). A limited set of third-year courses is offered each summer under the auspices of the Engineering Cooperative Program.

More-detailed materials describing the field program and possible concentrations may be obtained from the Sibley School of Mechanical and Aerospace Engineering, Upson Hall.

Nuclear Science and Engineering

Faculty members in the graduate Field of Nuclear Science and Engineering who are most directly concerned with the Master of Engineering (Nuclear) curriculum include D. D. Clark (faculty representative), K. B. Cady, H. H. Fleischmann, D. A. Hammer, and V. O. Kostroun.

Undergraduate Study

Although there is no separate undergraduate field program in nuclear science and engineering, students who intend to enter graduate programs in this area are encouraged to begin specialization at the undergraduate level. This may be done by choosing electives within regular field programs (such as those in engineering physics, materials science and engineering, and civil, chemical, electrical, or mechanical engineering) or within the College Program.

College Program

The suggested curriculum for the College Program in Nuclear Engineering includes NS&E 303, 304, 305, Introduction to Nuclear Science and Engineering I, II, and III, plus two of the four courses A&E 612, 651, 633, and 669. See the introductory section under College of Engineering for a general description of the College Program.
Master of Engineering (Nuclear) Degree Program

The two-term curriculum leading to the M.Eng (Nuclear) degree is intended primarily for individuals who want a terminal professional degree, but it may also serve as preparation for doctoral study in nuclear science and engineering. The course of study covers the basic principles of nuclear reactor systems with a major emphasis on reactor safety and radiation protection and control. The special facilities of the Ward Laboratory of Nuclear Engineering are described in the Announcement of the Graduate School.

The interdisciplinary nature of nuclear engineering allows students to enter from a variety of undergraduate specialties. The recommended background is (1) an accredited baccalaureate degree in engineering, physics, or applied science; (2) physics, including atomic and nuclear physics; (3) mathematics, including advanced calculus; and (4) thermodynamics. Students should see that they fulfill these requirements before beginning the program. In some cases, deficiencies in preparatory work may be made up by informal study during the preceding summer. General admission and degree requirements are described in the college's introductory section.

The following courses are included in the 30-credit program:

**Fall term**
- A&E 609, Low-Energy Nuclear Physics 3
- A&E 612, Nuclear Reactor Theory I 4
- A&E 633, Nuclear Engineering 3
  - Technical elective

**Spring term**
- A&E 651, Nuclear Measurements Laboratory 3
  - Technical elective
- Engineering design project
  - Mathematics or physics elective

Engineering electives should be in a subject area relevant to nuclear engineering, such as energy conversion, radiation protection and control, feedback control systems, magnetohydrodynamics, controlled thermonuclear fusion, and environmental engineering. The list below gives typical electives.

- M&AE 651, Transport Processes II 3
- EE 581, Introduction to Plasma Physics 3
- EE 582, Advanced Plasma Physics 3
- EE 471, Feedback Control Systems 3
- EE 572, Digital Control Systems 3
- A&E 613, Nuclear Reactor Theory II 3
- A&E 652, Advanced Nuclear and Reactor Laboratory 4
- A&E 636, Seminar on Thermonuclear Fusion Reactors 4
- A&E 638, Intense Pulsed Electron and Ion Beams I 3
  - Physics and Technology
- MS&E 705, The Effects of Radiation on Materials 3
- MS&E 484, Introduction to Controlled Fusion: Principles and Technology

Operations Research and Industrial Engineering


Bachelor of Science Curriculum

The program is designed to provide a broad and basic education in the techniques and modeling concepts needed to analyze and design complex systems and to provide an introduction to the technical and professional areas with which operations researchers and industrial engineers are concerned.

A student who plans to enter the Field Program in Operations Research and Industrial Engineering should take Introductory Engineering Probability (Engr 260).

For a student who has not taken Engr 260, entry into the field program in OR&IE is possible only by permission of the associate director for undergraduate studies. In addition, it is recommended that Computers and Programming (CS 211 or Engr 211) be taken before entry into the OR&IE field program. Early consultation with an OR&IE faculty member or with the associate director for undergraduate studies can be helpful in making appropriate choices. The required courses for the OR&IE field program and the typical terms in which they are taken are as follows:

**Term 5**
- OR&IE 320, Optimization I 4
- OR&IE 350, Cost Accounting, Analysis, and Control 4
- OR&IE 361, Introductory Engineering Stochastic Processes 4
- CS 211, Computers and Programming* 3
  - Course in humanities and social sciences 3

**Term 6**
- OR&IE 321, Optimization II 4
- OR&IE 370, Introduction to Statistical Theory with Engineering Applications 4
- OR&IE 410, Industrial Systems Analysis 4
  - Behavioral science 3
  - Course in humanities and social sciences 3

*If CS 211 has already been taken, an appropriate 3- or 4-credit technical elective must be substituted.

The behavioral science requirement can be satisfied by any of the following courses of an advanced nature, including Graduate School of Management (GSM) NCC 504 (offered only in the fall), which is recommended for those contemplating the pursuit of a graduate business degree, or Industrial and Labor Relations 120, 121, 151, and 320. The adviser must approve the selection in all cases.

The basic senior-year program, from which individualized programs are developed, consists of the following courses:

- Minimum credits
  - OR&IE 580, Digital Systems Simulation 3
  - Three upperclass OR&IE electives as described below 9
  - Two technical electives 6
  - Two courses in humanities and social sciences 6
  - Two free electives 6

Available OR&IE electives are as follows:

- Industrial systems: OR&IE 417, 421, 451, 562 and GSM NBA 601 and 641
- Optimization methods: OR&IE 431 and 435
- Applied probability and statistics: OR&IE 462, 471, 572, 563, 565, and 570

*No more than one course in the Graduate School of Management may be taken as an OR&IE elective.

Scholastic requirements for the field are a passing grade in every course, an overall average of at least 2.0 for each term the student is enrolled in the school, an average of 2.0 or better for OR&IE field courses, and satisfactory progress toward the completion of the degree requirements. The student's performance is reviewed at the conclusion of each term.

Master of Engineering (OR&IE) Degree Program

This one-year professional degree program stresses applications of operations research and industrial engineering and requires completion of a project. The course work centers on additional study of analytical techniques, with particular emphasis on engineering applications, especially in the design of new or improved man-machine systems, information systems, and control systems.

General admission and degree requirements are described in the introductory "Degree Programs" section. The M.Eng (OR&IE) program is integrated with the undergraduate program in Operations Research and Industrial Engineering. Also welcome are requests for admission from Cornell undergraduates in engineering programs other than OR&IE or from qualified non-Cornellians. To ensure the completion of the program in one calendar year, the entering student should have completed courses in probability theory and basic probabilistic models and in computer programming and should have acquired some fundamental knowledge of economic concepts required for decision making. Students interested in the manufacturing systems engineering option and the manufacturing internship program should obtain further information regarding program requirements from the office of the Cornell Manufacturing Engineering and Productivity Program, 319 Upson Hall.

I. For matriculants with preparation comparable to that provided by the undergraduate Field Program in Operations Research and Industrial Engineering:

**Fall term**
- OR&IE 516, Case Studies 4
- OR&IE 593, Applied OR&IE Colloquium 1
- OR&IE 599, Project 1
  - Three technical electives 9

**Spring term**
- OR&IE 894, Applied OR&IE Colloquium 1
- OR&IE 599, Project minimum of 4
  - Three technical electives 9

The electives specified above will normally be chosen from graduate courses offered by the School of Operations Research and Industrial Engineering. A minimum of 30 credits must be taken to complete the program.

II. For matriculants from other fields who minimally fulfill the prerequisite requirements (students who have the equivalent of OR&IE 370, 520, and 523 will take technical electives in their place):

**Fall term**
- OR&IE 370, Introduction to Statistical Theory with Engineering Applications 4
- OR&IE 520, Operations Research I 4
- OR&IE 516, Case Studies 4
- OR&IE 580, Digital Systems Simulation 4
- OR&IE 593, Applied OR&IE Colloquium 1
- OR&IE 599, Project 1

**Spring term**
- OR&IE 523, Introduction to Stochastic Modeling 4
- OR&IE 894, Applied OR&IE Colloquium 1
- OR&IE 599, Project minimum of 4
  - Two technical electives 6

Students fulfill the project requirement by working as part of a group of no more than four students on an operational systems problem that actually exists in some organization. Appropriate problems are suggested by manufacturing firms, retail organizations, service organizations, government agencies, and educational institutions.

Cooperative Program with the Johnson Graduate School of Management

Undergraduates majoring in operations research and industrial engineering may be interested in a cooperative program at Cornell that leads to both Master of Engineering and Master of Business Administration (M.B.A.) degrees. With appropriate curriculum planning such a combined B.S.-M.Eng./M.B.A. program can be completed in six years.

An advantage for OR&IE majors is that they study, as part of their undergraduate curriculum, several subjects that are required for the M.B.A. degree. This is because modern management is concerned with the operation of production and service systems, and much of the analytical methodology required to deal with operating decisions is the same as that used by systems engineers in designing these systems. An early start on meeting the business-degree requirements permits students accepted into the cooperative program to earn both the M.Eng (OR&IE) and M.B.A. degrees in two years rather than the three years such a program would normally take.
The details of planning courses for this program should be discussed with the admissions office of the Johnson Graduate School of Management.

In accordance with this program the candidate would receive the M.Eng. (OR&IE) degree at the end of five years, and the M.B.A. degree at the end of six years.

Further details and application forms may be obtained at the office of the School of Operations Research and Industrial Engineering, Upson Hall, and at the admissions office of the Johnson Graduate School of Management.

Theoretical and Applied Mechanics


Undergraduate Study

The Department of Theoretical and Applied Mechanics is responsible for courses in engineering mechanics and engineering mathematics, some of which are part of the Common Curriculum.

College Program in Engineering Science

A student may enroll in the College Program in Engineering Science, which is sponsored by the Department of Theoretical and Applied Mechanics. The College Program is described in the section on undergraduate study in the College of Engineering.

Engineering Courses

Courses offered in the College of Engineering are listed under the various departments and schools.

Courses are identified with a standard abbreviation followed by a three-digit number.

Engineering Common Courses

Agricultural Engineering
Chemical Engineering
Civil and Environmental Engineering
Computer Science
Electrical Engineering
Geological Sciences
Materials Science and Engineering
Mechanical and Aerospace Engineering
Nuclear Science and Engineering
Operations Research and Industrial Engineering
Theoretical and Applied Mechanics

Engineering Common Courses

100 Introduction to Computer Programming (also CS 100) Fall, spring, summer. 4 credits. The course content is the same as that of CS 100.

102 Drawing and Engineering Design (also M&AE 102) Fall, spring, 1 credit. Half-term course offered twice each semester. Enrollment limited. Recommended for students without previous mechanical drawing experience. S-U grades optional.

110 The Laser and Its Applications in Technology, Science, and Medicine (also A&EP 110) Fall, spring, 3 credits.

116 Modern Structures (also CEE 116) Spring. 3 credits.

117 Introduction to Mechanical Engineering (also M&AE 117) Fall. 3 credits. Consists of two half-term minicourses chosen from a list of three. Two of these minicourses alternate; the third (Drawing and Engineering Design) is offered every half term but has limited enrollment.

118 Introduction to Bioengineering (also Chem E 118) Fall. 3 credits.

Engineering Common Courses 271

polymers, fluid flow, and plant design will be introduced at an elementary level. Quantitative discussions butimated by lecture demonstrations will show how the engineering approach differs from a purely scientific one. The rapid solving of numerical problems is emphasized in homework and on tests.

113 Computer-aided Design in Environmental Systems (also CEE 113) Fall. 3 credits.

115 Engineering Application of Operations Research (also OR&IE 115) Fall, spring. 3 credits.

116 Modern Structures (also CEE 116) Spring. 3 credits.

M &AE 117) Fall. 3 credits. Consists of two half-term minicourses chosen from a list of three. Two of these minicourses alternate; the third (Drawing and Engineering Design) is offered every half term but has limited enrollment.

116 Modern Structures (also CEE 116) Spring. 3 credits.

117 Introduction to Mechanical Engineering (also M&AE 117) Fall. 3 credits. Consists of two half-term minicourses chosen from a list of three. Two of these minicourses alternate; the third (Drawing and Engineering Design) is offered every half term but has limited enrollment.

118 Introduction to Bioengineering (also Chem E 118) Fall. 3 credits.
119 Introduction to Manufacturing Engineering (also MSE 119 and OR&IE 119) Spring. 3 credits.
2 lecs, 1 lab.
Engineering considerations in the design, manufacturing, distribution, and service of products.
Transformer and control system, operations, and applications. Engineering problems in the design and management of a manufacturing facility and distribution channels. Visits may be made to local industries.

121 Fission, Fusion, and Radiation (also NS&E 121) Spring. 3 credits.
2 lecs, 1 lab or rec.
A lecture, demonstration, and laboratory course on (1) the physical nature and biological effects of nuclear radiation; (2) the benefits and hazards of nuclear energy; (3) light-water reactors, breeder reactors, and fusion reactors; and (4) the uses of nuclear radiation in physical and biological research. The laboratory work and demonstrations involve criticality and the control of Cornell's two research reactors; detection of, and protection against, nuclear radiation; neutron activation analysis using gamma-ray spectroscopy; and plasma sources and devices.

201 Introduction to the Physics and Chemistry of the Earth (also Geol 201) Fall. 3 credits.
Prerequisites: Mathematics 191 or 193, Physics 112, and Chemistry 207.
2 lecs, 1 rec, lab, or field trip. D. E. Karig.
Formation of the solar system, accretion and evolution of the earth, radioactive isotopes and the geological time scale, rocks and minerals, the continents and the oceans, erosion and sedimentation, weathering processes, the earth as a heat engine, volcanism, seismology, gravity, magnetism, plate tectonics, deformation of the earth's crust, comparative planetology.

202 Mechanics of Solids Fall. 3 credits.
Prerequisite: coregistration in Mathematics 293.
2 lecs, 1 rec, 4 labs each semester, evening exams. Principles of statics, force systems, and equilibrium; frameworks, mechanics of deformable solids, stress, strain, soil mechanics, and failure problems; mechanical properties of engineering materials; axial force, shear force, bending moment, singularity functions, plane stress; Mohr's circle, bending and torsion of bars, buckling and plastic behavior.

203 Dynamics Fall, spring. 3 credits.
Prerequisite: coregistration in Mathematics 294.
2 lecs, 1 rec, 4 labs each semester, evening exams. Newtonian dynamics of a particle, systems of particles, a rigid body Kinematics, motion relative to a moving frame, Impulse, momentum, angular momentum, energy, Rigid-body kinematics, angular velocity, moment of momentum, the inertia tensor. Euler equations, the gyroscope.

210 Introduction to Electrical Systems (also EE 210) Fall. spring. 3 credits.
Prerequisites or corequisites: Mathematics 293 and Physics 213.
3 lecs and optional tutorial/secs.
Circuit elements and laws, analysis techniques, operational amplifiers. Response of linear systems, with an introduction to complex frequency and phasors, forced response, average power, transfer function, pole-zero concepts, and the frequency spectrum. Terminal characteristics of diodes and transistors, linear models, feedback circuits, and frequency response of small-signal amplifiers.

211 Computers and Programming (also CS 211) Fall, spring, summer. 3 credits.
Prerequisite: CS 100 or equivalent programming experience.
2 lecs, 1 rec, 2 evening exams. For description see CS 211.

219, 220 Mass and Energy Balances (also Chem E 219, 220) 219. fall; 220, summer. 3 credits.
Prerequisite: one year of freshman chemistry. 219 is recommended for students planning to enter the Field Program in Chemical Engineering.
R. G. Thorpe.
Engineer design problems involving material and energy balances. Batch and continuous reactive systems in the steady and unsteady states. Humidification processes. Chem E 220 differs from 219 in that it uses only self-paced audiovisual instruction at the convenience of the student. A minimum of seventy clock hours of audiovisual instruction is required to master the subject matter. Student performance in 220 is evaluated by nine tests, two preliminary examinations, and a final examination; superior students may earn exemption from the final examination.

221 Thermodynamics Fall, spring, 3 credits.
Prerequisites: Mathematics 191 - 192 and Physics 112.
3 lecs.
The definitions, concepts, and laws of thermodynamics. Applications to ideal and real gases, multiphase pure substances, gaseous reactions. Heat-engine and heat-pump cycles, with an introduction to energy-conversion systems.

222 Introduction to Scientific Computation (also CS 222) Spring. 3 credits.
Prerequisites: CS 100 and Mathematics 112, 122, or 192.
2 lecs, 3 evening exams.
Students write FORTRAN programs to solve representative problems from elementary calculus. Emphasis is on the design of numerical software that is efficient, reliable, stable, and portable. Special topics include supercomputing and parallel computation.

241 Engineering Computation (also CEE 241) Fall, spring. 3 credits.
Prerequisites: CS 100, and Mathematics 293. Corequisite: Mathematics 294.
J. R. Sedding, J. A. Logan.

260 Introductory Engineering Probability (also OR&IE 260) Fall, spring. 3 credits.
Prerequisite: first-year calculus.
3 lecs.
The basic tools of probability and their use in engineering. This may be the last course in probability for some students, or it may be followed by OR&IE 361, Introductory Engineering, Stochastic Processes I, or by OR&IE 370, Introduction to Statistical Theory with Engineering Applications. Definition of probability; random variables; probability distributions, density functions, expected values; jointly distributed random variables; distributions such as the binomial, Poisson, and exponential that are important in engineering and how they arise in practice; limit theorems.

261 Introduction to Mechanical Properties of Materials Fall, spring. 3 credits.
2 lecs, 1 rec or lab.
The relation of elastic deformation, plastic deformation, and fracture properties to structure and defects on a microscopic scale in metals, ceramics, polymers, and composite materials. Design and processing of materials to achieve high modulus, damping capacity, hardness, fracture strength, creep resistance, or fatigue resistance. Flaw-tolerant design methods using fracture mechanics.

262 Introduction to Electrical Properties of Materials Spring. 3 credits.
2 lecs, 1 rec or lab.
Electrical and structural properties of semiconductors, oxide layers, and metal films that are used in modern integrated circuits. Crystal structure, growth of semiconductors, deposition of thin films, electrical conduction, semiconductor, transistors, and light-emitting diodes. Interplay between structural and electrical properties and their application to the design of semiconductor devices and integrated circuits.

264 Computerized-Instrumentation Design (also A&E 264) Fall, spring. 3 credits.
Prerequisites: Engr 100 or CS 100, and Physics 213, or the equivalent.
2 lecs, 1 lab.
Design techniques for incorporating small computers into experimental apparatus. Experiments in elementary physics are performed with appropriate sensors wired to computer interfaces, under program control that employs routines written in BASIC and ASSEMBLY languages. Analog-to-digital converters, digital-to-analog converters, optical encoders, and stepping motors are used. Graphical display of data and theoretical fit are emphasized.

270 Basic Engineering Probability and Statistics Fall, spring. 3 credits.
Students who intend to enter the upperclass Field Program in Operations Research and Industrial Engineering should take Engr 260 instead of this course. Prerequisite: first-year calculus.
3 lecs, evening exams.
At the end of this course a student should command a working knowledge of basic probability and statistics as they apply to engineering work. For students who want to have greater depth in probability and statistics, a course in probability (OR&IE 260) followed by a course in statistics (OR&IE 370) is recommended.

Agricultural Engineering

Courses in agricultural engineering will be found in the section listing the offerings of the College of Agriculture and Life Sciences.

Applied and Engineering Physics

110 The Laser and Its Applications in Science, Technology, and Medicine (also Engr 110) Fall, spring. 3 credits. This is a course in the Introduction to Engineering series.
2 lecs, 1 lab.
For description see Engineering Common Courses.

264 Computerized-Instrumentation Design (also Engr 264) Fall, spring. 3 credits.
Prerequisites: Engr 100 or CS 100, and Physics 213 or the equivalent.
2 lecs, 1 lab.
For description see Engineering Common Courses.

303 Introduction to Nuclear Science and Engineering I (also NS&E 303) Fall. 3 credits.
Prerequisite: Physics 214 or Mathematics 294.
3 lecs. V. O. Kastroun.
For description see NS&E 303.

304 Introduction to Nuclear Science and Engineering II (also NS&E 304) Spring. 3 credits.
Prerequisite: A&E 303.
3 lecs. D. D. Clark.
For description see NS&E 304.
Introduction to Biophysics

A systematic quantitative introduction to biophysics as the biological sciences. The unity of the physical, chemical, and biological sciences is stressed. Six topics will be chosen from among the following seven: metabolic electron transport, the role of cell membranes, molecular, and cellular perception; biophysical applications of genetic engineering, and physics of movement.

Mechanics of Particles and Solid Bodies

Fall. 4 credits. 3 lecs, 1 rec. H. H. Fleischmann. Newton's laws; coordinate transformations; generalized coordinates and momenta; Lagrangian and Hamiltonian formulation; applications to oscillators, restrained motion, central forces, small vibrations of multiparticle systems, motion of a rigid body.

Intermediate Electromagnetism

Fall. 4 credits. Prerequisites: Physics 214 and coregistration in Mathematics 421 or TAM 610, or permission of instructor. 3 lecs, 1 rec. J. Silcox. Topics: vector calculus, electrostatics, magnetostatics, and induction phenomena; solutions to Laplace's equation in various geometries, electric and magnetic fields, electric and magnetic forces, energy storage, skin effect, quasi-stationary. Emphasis on physical concepts and applications to design of high-voltage generators, electron guns, and particle accelerators.

Intermediate Electrodynamics

Spring. 4 credits. Prerequisite: A&EP 355 and coregistration in Mathematics 422 or TAM 611, or permission of instructor. 3 lecs, 1 rec. J. Silcox. Topics: electromagnetic wave phenomena, transmission lines, waveguides, dispersive media, scattering, radiation, reciprocity, physical optics, special relativity. Emphasis on physical concepts and their application to the design of microwave circuits, antenna arrays, and optically coupled systems.

Introductory Quantum Mechanics

Spring. 4 credits. Prerequisites: A&EP 333 or Physics 318; coregistration in Mathematics 422 or TAM 611 and in A&EP 356 or Physics 216. 3 lecs, 1 rec. M. S. Nelkin. A first course in the systematic theory of quantum phenomena. Topics include the harmonic oscillator, the Dirac formalism, angular momentum, the hydrogen atom, and perturbation theory. Analytical solutions of the Schroedinger equation are supplemented with numerical solutions on a microcomputer.

Electronic Circuits (also Physics 360)

Fall, spring. 4 credits. Prerequisite: Physics 268 or 213 or permission of instructor; no previous experience with electronics is assumed. Fall term is generally less crowded. 1 lec, 2 labs.

This laboratory course focuses on designing, building, and testing analog, digital, and microprocessor-based circuits that are useful in electronic instrumentation. Analog topics include basic circuit concepts, applications of operational amplifiers in linear circuits, oscillators and comparators, transistor circuits and devices, information and signal processing circuits, and protective circuits. Students also design and build digital circuits that incorporate Schmidt triggers, comparators, and sequential and sequential logic using medium-scale integrated circuits. Quantrum topics are studied. At the level of Principles of Electronic Instrumentation, by Dieterlender.

Statistical Thermodynamics

Spring. 4 credits. Prerequisites: Engr 221 for engineering physics seniors; others by permission of instructor. 3 lecs, 1 rec. R. V. Loveless. Quantum statistical basis for equilibrium thermodynamics, canonical and grand canonical ensemble averages. Quantitative and classical ideal gases and paramagnetic systems. Fermi-Dirac, Bose-Einstein, and Maxwell-Boltzmann statistics. Introduction to systems of interacting particles. At the level of Thermal Physics, by Kittel, and Statistical and Thermal Physics, by Reif.

Continuum Physics

Fall. 4 credits. Prerequisites: A&EP 223 and 356 or equivalent. 3 lecs, 1 rec. M. S. Nelkin. Local conservation laws; stress, strain, and rate-of-strain tensors: equations of motion for elastic and viscous materials; flow of a viscous incompressible fluid and the Navier-Stokes equations; Reynolds number, Poseuille flow in a pipe, Stokes drag on a sphere, boundary layers, Blasius equations; flow instabilities, Rayleigh-Benard convection and the onset of chaotic flow. Introduction to turbulent flow.

Physical and Integrated Optics


Informal Study in Engineering Physics

Credit to be arranged. Laboratory or theoretical work in any branch of engineering physics under the direction of a member of the staff. The study can take a number for forms; for example, design of experiment apparatus, performance of laboratory measurements, or theoretical design or analysis.

Introduction to Plasma Physics (also EE 581)

Fall. 4 credits. Prerequisites: A&EP 355 or 356 or equivalent. Open to fourth-year students with permission of instructor. 3 lecs, 1 lab. H. F. Fleischmann. Credit to be arranged. Open to fourth-year students with permission of instructor.

Modern Physical Methods in Macromolecular Characterization

Spring. 3 credits. Prerequisite: a course in quantum mechanics or permission of instructor. Intended for advanced undergraduates or graduate students. Offered alternate years. Not offered 1987–88. Prerequisite: a year of advanced calculus and some nuclear physics.

612 Nuclear Reactor Theory I

Fall. 4 credits. Prerequisite: a year of advanced calculus and some nuclear physics. 3 lecs. Physical theory of fission reactors. Fission and neutron interactions with matter, theory of neutron diffusion, slowing down and thermalization; calculations of criticality and neutron flux distribution in nuclear reactors. Reactor kinetics. At the level of Nuclear Reactor Theory, by Lamarche.

613 Nuclear Reactor Theory II

Spring. 3 credits. A continuation of A&EP 612, intended primarily for students planning research in nuclear reactor physics and engineering. Prerequisite: A&EP 612. 3 lecs. K. B. Cady. The Boltzmann linear transport equation, its adjoint, and their approximate solutions are developed and applied to the heterogeneous neutron chain reactor.

614 Special Topics in Biophysics

W. W. Webb. To be determined and schedule to be announced. Seminars on selected topics of current interest in biophysics research.

615 Membrane Biophysics


616 Modern Physical Methods in Macromolecular Characterization

Spring. 3 credits. Prerequisite: a course in quantum mechanics or permission of instructor. Intended for advanced undergraduates or graduate students. Offered alternate years. Not offered 1987–88. Modern physical methods of macromolecular characterization, with emphasis on techniques such as subpicosecond and picosecond fluorescence and absorption spectroscopy, excited and ground-state dipole-moment measurement, tunable-laser thermal lens spectroscopy, tunable-laser Raman and coherent anti-Stokes Raman spectroscopy of ground and excited molecular states, and the measurement of vibrational optical activity. The course should appeal to students who are interested either in the use of such physical techniques for characterizing macromolecular materials or in the physics of macromolecules and macromolecular assemblies. Macromolecular systems used as examples are of biological interest or are physically interesting polymeric materials.

Electron Optics

Spring. 3 credits. Offered alternate years. M. S. Isaacson. Basic electron optics with emphasis on the fundamental principles of the production and focusing of charged-particle beams. Special consideration is given to the optics appropriate for beam transport and probe forming systems and systems useful in materials characterization. Included are discussions of the calculation of trajectories in multicomponent optical systems, comprehensive treatments of optical aberrations, and practical considerations of electron optical design.

Nuclear Engineering

Fall. 4 credits. Prerequisite: introductory course in nuclear engineering. The fundamentals of nuclear reactor engineering, reactor siting and safety, fluid flow and heat transfer, control, and radiation protection.
634 Nuclear Engineering Design Seminar Fall. 4 credits. Prerequisite: A&EP 633. A group design study of a selected nuclear system. Emphasis is on safety, siting, and radiation protection in the design of nuclear systems.

636 Seminar on Thermonuclear Fusion Reactors Fall. 3 credits. Prerequisite: basic course in plasma physics or nuclear reactor engineering, or permission of instructor. Offered alternate years. Analysis of variance, physical and engineering problems in design and construction of fusion reactors. Topics include basic reactor schemes, materials, mechanical and heat-transfer problems, radiation and safety, superconducting magnets, energy conversion, plasma impurities, and economics.

638 Intense Pulsed Electron and Ion Beams: Physics and Technology Spring. 2 credits. Prerequisites: EE 581 or 582 (A&EP 606, 607) or equivalent, or permission of instructor. Topics include (1) theoretical aspects of intense electron and ion beams, such as equilibria and stability; (2) technology of intense beam production, such as pulsed-power generator principles, and electron and ion and diode operation; and (3) applications of intense beams, such as controlled fusion, microwave generation, and laser pumping. Extensive discussion of experimental results.

651 Nuclear Measurements Laboratory Spring. 4 credits. Prerequisite: some nuclear physics. Two 2 1/2-hour afternoon periods plus 1 lab. Lectures on interaction of radiation with matter, radiation biology, and nuclear instruments and measurements. Fifteen experiments are available (from which eight are selected) on nuclear physics, radiation instrumentation and measurements, activation analysis, neutron moderation, and reactor physics and engineering, the subcritical reactor assembly and TRIGA reactor are used. At the level of Nuclear Radiation Detection, by Price, and Radiation Detection and Measurement, by Knoll.

652 Advanced Nuclear and Reactor Laboratory Spring. 3 credits. Prerequisites: A&EP 651, and 609 or 612. Offered on independent study basis or, with subject's consent, as a formal course. Two 2 1/2-hour afternoon periods. Laboratory experiments and experimental methods in nuclear physics and reactor physics. Ten experiments are available, some using the Zero Power Reactor, critical facility.

661 Microcharacterization Fall. 3 credits. Prerequisites: Physics 421, and 214, or an introductory course in modern physics. The basic physical principles underlying the many modern microanalytical techniques available for characterizing materials. Discussion centers on the physics of the interaction process by which the characterization is performed, the advantages and limitations of each technique, and the instrumentation involved in each characterization method (including charged-particle optics when appropriate).

662 Microprocessing of Materials Spring. 3 credits. Several field trips. An introduction to the fundamentals of fabricating and patterning thin-film materials and surfaces, with emphasis on electronic materials. Vacuum and plasma thin-film deposition processes, Photon, electron, X-ray, and ion-beam lithography. Techniques for pattern replication by plasma and ion processes. Emphasis is on understanding the physics and materials science that define and limit the various processes.

681–689 Special Topics in Applied Physics Topics, instructors, and credits to be announced each term. Typical topics include quantum superconducting devices, physics of submicron conductors, nonlinear fluctuations, biophysical processes, molecular fluorescence.

711 Principles of Diffraction (also MS&E 610) Fall. 3 credits. B. W. Bateman. Introduction to diffraction phenomena as applied to solid-state problems. Scattering and absorption of neutrons, electrons, and X-ray beams, with particular emphasis on synchrotron radiation X-ray sources. Diffraction from two- and three-dimensional periodic lattices. Fourier representation of scattering centers and the effect of thermal vibrations. Diffraction from almost periodic structures, surface layers, gases, and amorphous materials. Survey of dynamical diffraction from perfect and imperfect lattices. Several laboratory experiments will be conducted.

751, 752 Project 751, fall; 752, spring. Credit to be arranged. Informal study under the direction of a member of the university staff. Students are offered some research experience through work on a special problem related to their field of interest.

753 Special Topics Seminar in Applied Physics Fall, spring. 4 credits Prerequisites: undergraduate physics. Required for candidates for the M.Eng. (Engineering Physics) degree and recommended for seniors in engineering physics.

761 Kinetic Theory (also EE 661) Fall. 3 credits. Prerequisite: EE 407. Physics 561, or permission of instructor. Offered alternate years. 2 lecs. For description see EE 661.


Chemical Engineering

101 Nonresident Lectures Spring. No credit. 1 lec. R. L. VonBerg. Given by lecturers invited from industry and from selected departments of the university to assist students in their transition from college to industrial life.

112 Introduction to Chemical Engineering (also Engr 112) Fall, spring. 3 credits. Limited to freshmen. 2 lecs. 1 rec. R. K. Finn, F. Rodriguez. For description see Engineering Common Courses.

118 Introduction to Bioengineering (also Engr 118) Fall. 3 credits. 2 lecs, 1 lab. W. L. Olbricht. For description see Engineering Common Courses.

219 Mass and Energy Balances (also Engr 219) Fall. 3 credits. Prerequisite: one year of freshman chemistry or permission of instructor. 3 lecs. 1 computing session. R. G. Thorpe. For description see Engineering Common Courses.


313 Chemical Engineering Thermodynamics Fall. 4 credits. Corequisite: physical chemistry. 4 lecs, 1 computing session. J. A. Zolweg. A study of the first and second laws, with application to batch and flow processes. Thermodynamic properties of fluids; applications of thermodynamics to compressors, power cycles, refrigeration; thermodynamic analysis of processes. Thermodynamics of mixtures, phase equilibria and phase diagrams. Estimation methods. Heat effects, chemical equilibria.

323 Fluid Mechanics Fall. 3 credits. Prerequisites: Chem E 219 and engineering mathematics sequence. 3 lecs, 1 computing session. P. H. Steen. Fundamentals of fluid mechanics. Macroscopic and microscopic balances. Applications to problems involving viscous flow.


332 Analysis of Separation Processes Spring. 4 credits. Prerequisites: Chem E 313 and 323. 3 lecs, 1 computing session. G. F. Scheele. Analysis of separation processes involving phase equilibria and rate of mass transfer; some use of the digital computer. Phase equilibria; binary, multicomponent, and extractive distillation; liquid-liquid extraction; gas absorption; crystallization.

390 Reaction Kinetics and Reactor Design Spring. 3 credits. Prerequisites: Chem E 313 and 323. 3 lecs. A. B. Anto. A study of chemical reaction kinetics and principles of reactor design for chemical processes.

432 Chemical Engineering Laboratory Fall. 4 credits. Prerequisites: Chem E 323, 324, 332, and 390. 2 lecs, 1 lab. H. D. Haller and staff. Laboratory experiments in fluid dynamics, heat and mass transfer, other operations. Correlation and interpretation of data. Technical report writing.

462 Chemical Process Design Spring. 4 credits. Prerequisite: Chem E 432. R. L. VonBerg and staff. A consideration of process and economic alternatives in selected chemical processes; design and assessment.

472 Process Control Fall. 3 credits. Prerequisites: Chem E 324 and 390. 3 lecs, 1 lab. P. Harriott. Analysis of the dynamics of chemical processes and design of feedback control systems with emphasis on control of chemical reactors and separation systems.

490 Undergraduate Projects in Chemical Engineering. Variable credit. Research studies on special problems in chemical engineering.
563 Process Equipment Selection and Design  
Fall. 3 credits. Prerequisites: Chem E 324 and 390 or equivalent.
3 lecs. R. L. Von Berg.
Performance, selection, and design of process equipment: storing, transporting, mixing, heating, and separating fluids and solids. Process development and decision among alternatives.

564 Design of Chemical Reactors  
Spring. 3 credits. Prerequisite: Chem E 390 or equivalent.
3 lecs. P. Harriott.
Design, scale-up, and optimization of chemical reactors with allowance for heat and mass transfer and nonideal flow patterns. Homework problems feature analysis of data for gas-solid, gas-liquid, and three-phase reaction systems.

565 Design Project  
Spring. 3 or 6 credits.
Prerequisite: Chem E 564. Required for students in the M.Eng. (Chemical) program.
Staff.
Design study and economic evaluation of a chemical processing facility, alternative methods of manufacture, raw-material preparation, food processing, waste disposal, or some other aspect of chemical processing.

566 Computer-aided Process Design  
Fall. 3 credits. Prerequisite: Chem E 332 or equivalent.
3 lecs. C. F. Schaefer.
An introduction to the synthesis and use of computer systems for steady-state simulation and optimization of chemical processes. Synthesis of heat exchanger networks and separation systems.

590 Special Projects in Chemical Engineering  
Variable credit. Limited to graduate students.
Non—thesis research or studies on special problems in chemical engineering.

611 Phase Equilibria  
Fall. 3 credits. Prerequisite: physical chemistry.
3 lecs. R. G. Thope.
A detailed study of the pressure-temperature-composition relations in binary and multicomponent heterogeneous systems in which several phases are of variable composition. Prediction of phase data.

640 Polymeric Materials  
Fall. 3 credits.
3 lecs. F. Rodriguez.
Chemistry and physics of the formation and characterization of polymers. Principles of fabrication.

641 Physical Polymer Science  
Spring. 3 credits.
Prerequisite: Chem E 640 or equivalent. Offered alternate years. Not offered 1987–88.
3 lecs. C. Cohen.

642 Polymeric Materials Laboratory  
Spring. 2 or 3 credits. Prerequisite: Chem E 640.
F. Rodriguez.
Experiments in the formation, characterization, fabrication, and testing of polymers.

643 Introduction to Bioprocess Engineering  
Fall. 3 credits. Prerequisite: Chem E 390 or permission of instructor. No prior background in the biological sciences required.
3 lecs. R. K. Finn, M. L. Shuler.
A discussion of principles involved in using microorganisms and enzymes for processing. Application to food and fermentation industries and to biological waste treatment.

645 Advanced Concepts in Biological Engineering  
Spring. 3 credits. Prerequisite: Chem E 643 or equivalent or permission of instructor.
Fundamentals of biochemical engineering science with emphasis on enzyme processing, mathematical models of cell growth, bioreactors, product recovery, bioseparations, the use of tissue culture, and genetically modified organisms.

646 Controlled Cultivation of Microbial Cells  
Spring (January intersession). 3 credits. Prerequisite: Microbiology 291 or equivalent.
A projects course. Use of batch- and continuous-stirred-tanks to explore the physiology of microorganisms under conditions simulating industrial practice.

648 Polymers in Electronics and Related Areas  
Spring. 3 credits. Prerequisite: 640 or permission of instructor.
3 lecs. P. Rodriguez.
Applications of polymers as resists for microolithography, as insulators, and as conductors. Radiation effects, polymer synthesis, and surface characterization. Additional special topics may be covered.

661 Air Pollution Control  
Fall. 3 credits.
3 lecs. P. Harriott.
Origin of air pollutants. Design of equipment for removal of particulate and gaseous pollutants formed in combustion and chemical processing.

673 Adsorption and Catalysis  
Spring. 2 credits.
F. B. Li.
The physics and chemistry of adsorption on reactive surfaces and catalysis. Emphasis on the use of modern spectroscopic techniques to determine the geometric structure, electronic structure, and reaction sequences on well-defined surfaces. Discussion of several catalytic systems.

711 Advanced Chemical Engineering Thermodynamics  
Fall. 3 credits. Prerequisite: Chem E 313 or equivalent.
3 lecs. K. E. Gubbins, A. Panagiotopoulos.
Application of general thermodynamic methods to advanced problems in chemical engineering. Evaluation, estimation, and correlation of properties; chemical and phase equilibria.

713 Applied Chemical Kinetics  
Fall. 3 credits. Prerequisite: Chem E 390 or equivalent.
3 lecs. R. P. Merrill.
Stoichiometry of multiple reactions, complex monomolecular kinetics, lumping analysis in monomolecular and continuous reaction mixtures, nonideal reactors, kinetics of catalyzed reactions, multiple steady states in chemical reactors, principles of heterogeneous catalysis, selected topics in biochemical engineering kinetics.

721 Thermodynamics and Phase Change Heat Transfer (also M&AE 652)  
Fall. 4 credits.
Prerequisite: graduate standing or permission of instructor.
C. T. Awedsian.

731 Advanced Transport Phenomena  
Spring. 3 credits. Prerequisite: Chem E 323 and 324 or equivalent.
3 lecs. D. L. Koch.
304 Uncertainty Analysis in Engineering Fall. 4 credits. Prerequisite: first-year calculus.
J. R. Stedinger
An introduction to probability theory, statistical techniques, and uncertainty analysis, with examples drawn from civil, environmental, agricultural, and related engineering disciplines. The course covers data presentation, probability theory, commonly used probability distributions, parameter estimation, goodness-of-fit tests, confidence intervals, hypothesis testing, simple linear regression, and some nonparametric statistics and decision theory. Examples include structural reliability, models of vehicle arrivals, analysis of return-period calculations, and distributions describing wind speeds, floods, pollutant concentrations, and soil and material properties.

309 Special Topics in Civil and Environmental Engineering Fall, spring. 1–6 credits.
Staff.
Supervised study by individuals or groups of upper-division students on one or more specialized topics not covered in regular courses.

501 Civil and Environmental Engineering Design Project I Fall. 3 credits. Required for students in the M.Eng.(Civil) program.
School faculty and visiting engineers.
Design of major civil engineering project. Planning and preliminary design in fall term; final design in January intersession (CEE 502).

502 Civil and Environmental Engineering Design Project II Spring (work done during January intersession). 3 credits. Required for students in the M.Eng.(Civil) program.
W. D. Philpot.
School faculty and visiting engineers.
A continuation of CEE 501.

503 Professional Practice in Engineering Spring. 3 credits. Required for and limited to students in the M.Eng.(Civil) program.
W. R. Lynn.
Financial, legal, regulatory, ethical, and business aspects of engineering practice are examined in detail. Students are expected to develop their understanding of the interactions among the physical, social, economic, and ethical constraints on engineering design.

701 Environmental Engineering Department Seminar Fall, spring. 1 credit.
Staff.
Presentation of topics of current interest in environmental engineering.

Remote Sensing

610 Remote Sensing Fundamentals Fall. 3 credits. Prerequisite: permission of instructor.
W. R. Philpott.
Fundamentals of sensing earth resources with sensors of electromagnetic radiation. Coverage includes sensors, sensor and ground data acquisition, data analysis and interpretation, and project design.

611 Remote Sensing: Environmental Applications Spring. 3 credits. Prerequisite: permission of instructor.
2 lecs, 1 lab. W. R. Philpott.
Applications of remote sensing in various environmental disciplines. Emphasis is on the use of aircraft and satellite imagery for studying surface features in engineering, planning, agriculture, and natural resource assessments.

612 Physical Environment Evaluation Fall. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.
2 lecs, 1 lab. Staff.
Physical environmental factors affecting engineering planning decisions: climate, soil and rock conditions, water sources. Evaluation methods: interpretation of meteorological, topographic, geologic, and soil maps, aerial photographs, and subsurface exploration records.

613 Image Analysis I: Landforms Fall. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.
2 lecs, 1 lab. Staff.
Analysis and interpretation of aerial photographs for a broad spectrum of soil, rock, and drainage conditions. Specific fields of application are emphasized.

614 Image Analysis II: Physical Environments Fall. 3 credits. Prerequisite: CEE 612 or 613. Not offered 1987–88.
2 lecs, 1 lab. Staff.
Study of physical environments using aerial photographs and other remote sensing methods. Conventional photography: spectral, space, and sequential photography; thermal and radar imagery. Arctic, tropical, arid, and humid climate regions. Project applications.

615 Digital Image Processing Fall. 3 credits. Prerequisites: facility with algebra (Mathematics 109) and statistics (Engr 206 or Agricultural Economics 310), or permission of instructor.
W. D. Philpott.
An introduction to digital image-processing concepts and techniques, with emphasis on techniques used in remote-sensing applications. Topics include image acquisition, enhancement procedures, spatial and spectral feature extraction, and classification. Assignments will require the use of microcomputer-based image-processing software and graphics.

616 Digital Image Analysis Spring. 3 credits. Prerequisites: calculus (Mathematics 162), statistics (Engr 206 or Agricultural Economics 310) and computer programming (FORTRAN, Pascal, or C), or permission of instructor.
W. D. Philpott.
Pattern recognition, feature extraction and classification of digital images as used in remote-sensing applications. Both spectral and spatial patterns will be considered. Assignments will require the development of computer programs and will make use of microprocessor-based image-processing software and graphics.

617 Project—Remote Sensing On demand. 1–6 credits.
Staff.
Students may elect to undertake a project in remote sensing and environmental evaluation. The work is supervised by a professor in this subject area.

618 Special Topics—Remote Sensing On demand. 1–6 credits.
Staff.
Supervised study in small groups on one or more special topics not covered in the regular courses. Special topics may be of a theoretical or applied nature.

619 Seminar in Remote Sensing Spring. 1 credit. S-U grades only.
W. R. Philpott.
Presentation and discussion of current research, developments, and applications in remote sensing. Lectures by Cornell staff and invited specialists from government, industry, and other institutions.

710 Research—Remote Sensing On demand. 1–6 credits.
Staff.
For students who want to study one particular area in depth. The work may take the form of laboratory investigation, field study, theoretical analysis, or development of design procedures.

810 Thesis—Remote Sensing Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term. A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

Environmental and Public Systems

321 Microeconomic Analysis (also Economics 313, section 5) Fall. 4 credits. Prerequisite: one semester of calculus. A social science elective for engineering students.
R. E. Schuler.
Intermediate microeconomic analysis similar to Economics 313 but emphasizing mathematical techniques and engineering-design implications. Theory of consumer choice and efficient production, analysis of monopoly and competitive markets, theories of distribution, market equilibrium and welfare economics.

322 Economic Analysis of Government (also Economics 308) Spring. 4 credits. Prerequisites: one semester of calculus, plus CEE 321 or Economics 313. A social science elective for engineering students.
R. E. Schuler.
Analysis of government intervention in a market economy and implications for engineering planning and design. Market imperfections, public goods, public finance, cost-benefit analysis, environmental regulation, risk management, and macroeconomic topics.

323 Engineering Economics and Management Spring. 3 credits. Primarily for juniors and seniors.
D. P. Loucks.
Introduction to engineering and business economics and to methods of operational research intended to give students a working knowledge of money management and how to make economic comparisons of alternative engineering designs or projects. Project management, inflation, taxation, depreciation, financial planning, and basic operations research techniques of simulation and optimization are discussed.

N. Orloff.
Examination of the debate on topics such as acid rain, cleanup of hazardous-waste sites, risk assessment for carcinogens, and judicial review of the decisions of regulatory agencies.]

525 Environmental Law I (also Toxicology 625) Fall. 4 credits. Limited to graduate students and seniors; other undergraduates with permission of instructor.
R. Mayer.
An introduction to how the legal system handles environmental problems. Study of federal statutes such as the National Environmental Policy Act, the Clean Air Act, and the Clean Water Act; the regulations issued to implement them; and the important judicial decisions that have been handed down under each.

526 Environmental Law II (also Toxicology 626) Spring. 3 credits. Limited to graduate students and seniors; other undergraduates with permission of instructor. Recommended: CEE 525 or equivalent. Not offered 1987–88.
N. Orloff, R. Booth.
Analysis of additional components of environmental law, such as those pertaining to toxic substances, hazardous wastes, and management of public lands.]

[527 Regulation of Toxic Substances (also Toxicology 627) Spring. 3 credits. Limited to graduate students and seniors. Recommended: CEE 525 or equivalent. Not offered 1987–88.
N. Orloff.
Analysis of the legal doctrines and the scientific tools used by federal agencies to make decisions regarding human exposure to toxic substances. The programs of EPA, FDA, CPSC, and OSHA are examined.]
526 Interactive Modeling with Microcomputer Graphics

Spring. 3 credits. Prerequisite: Engr 241 or Engr 222, and permission of instructor. D. P. Loucks.

Principles of interactive modeling and its application to the design and management of environmental and water-resources engineering systems. Topics will include tablet and video digitizing, image processing (including editing and overlaying pictures and maps), contouring, opaque and transparent coloring, generating 2-D and 3-D colored graphs, and developing pre- and post-processors to permit the interactive use of various models for synthesizing designs and operating policies and for predicting system performance. Microcomputers with high-quality color-graphics capabilities will be available together with numerous interactive graphics subroutines.

529 Water and Environmental Resources Problems and Policies

Fall. 3 credits. Intended primarily for graduate engineering and non-engineering students but open to qualified upperclass students. Prerequisite: permission of instructor.

Design or feasibility study of environmental or water resources systems, supervised and assisted by one or more faculty advisers, individual or group participation. Final report required.

721 Environmental and Water Resources Systems Analysis Design Project

Fall, spring. 1 credit. Staff.

Incorporates material from CEE 622. Final report required.

722 Environmental and Water Resources Systems Analysis Research

Fall, spring. 1 credit. Staff.

Evaluation, appraisal, and prospects for problems involving water and environmental resources. Organization and public policies in the federal system.

620 Water-Resources Systems I

Fall. 3 credits. Prerequisite: CEE 323 or equivalent. D. P. Loucks.

Development and application of techniques for deterministic and stochastic optimization and simulation in water-resources planning. River-basin modeling, including reservoir design and operation, irrigation planning and operation, hydropower-capacity development, flow augmentation, flood control and protection, and water-quality models.

621 Water-Resources Systems II

Spring. 3 credits. Prerequisite: CEE 304 and 620 or permission of instructor. Not offered 1987–88. J. R. Steidinger, D. P. Loucks.

Advanced topics in the development and use of optimization and simulation models for water-resources planning. Stochastic hydrologic modeling and stochastic river-basin and reservoir models. Incorporates material from CEE 622.

622 Stochastic Hydrologic Modeling

On demand. 2–3 credits. Prerequisite: OR/E 370 or CEE 304. J. R. Steidinger.

Develops statistical techniques used to analyze and model stochastic processes. Examination of Box-Jenkins, fractional-Brownian noise, and other single- and multiple-site stream-flow models; drought- and flood-frequency estimation, analysis of simulation output; parameter estimation and Bayesian inference.

623 Water Quality Systems Analysis

Spring. 3 credits. Prerequisites: Math 294 and optimization (CEE 323, Ag En 475), or OR/E 320/520. C. A. Shoemaker.

Applications of optimization and simulation methods to the design and operation of facilities for managing the quality of surface- and groundwater. Applications include location of wastewater and hazardous-waste facilities, restoration of dissolved oxygen levels in rivers, and remediation of contaminated aquifers. Optimization techniques include separable convex (linear) programming, integer programming, and nonlinear programming.

624 Risk Analysis and Management

Spring. 3 credits. Prerequisite: CEE 304 or OR/E 270 or equivalent. M. A. Turqumt.

Analysis and management of risks in technological systems, particularly those associated with energy production, waste disposal, and transportation of hazardous materials. Probabilistic risk analysis and decision making. The role of risk in benefit-cost analyses and in environmental impact statements. Setting of regulatory standards.

626 Modeling Managed Ecosystems

Fall. on demand. 3 credits. Prerequisites: Mathematics 294, statistics, and population ecology. Not offered 1987–88. C. A. Shoemaker.

The use of optimization and statistical estimation procedures to develop strategies for managing populations and ecosystems. Primary focus will be on pest management, pollinator populations, and mitigation of potential pollution from pesticides.

721 Environmental and Water Resources Systems Analysis Design Project

Fall, spring. 1 credit. Staff.

Design or feasibility study of environmental or water resources systems, supervised and assisted by one or more faculty advisers, individual or group participation. Final report required.

722 Environmental and Water Resources Systems Analysis Research

Fall, spring. 1 credit. Staff.

Lectures in various topics related to environmental or water resources systems planning and analysis.

729 Special Topics in Environmental or Water Resources Systems Analysis

On demand. Variable credits. Staff.

Supervised study by individuals or small groups, of one or more specialized topics not covered in regular courses.

Fluid Mechanics and Hydrology

331 Fluid Mechanics

Fall. 4 credits. Prerequisite: Engr 203 (may be taken concurrently). 3 lecs., 1 rec., evening exams. Staff.

Fluid mechanics and equations of single-phase and multiphase flow; methods of solution. Applications involve aquifer hydrodraulics, pumping wells; drought flows; infiltration, groundwater recharge; land subsidence; seawater intrusion, miscible displacement; transient seepage in unsaturated materials.

634 Engineering Micrometeorology

Fall. 3 credits. Prerequisite: CEE 331. 3 lecs. W. H. Brutsaert.

Physical processes in the lower atmospheric environment: turbulent transport in the atmospheric boundary layer; surface-air interaction; disturbed boundary layers, radiation. Applications include sensible and latent heat transfer from lakes, plant canopy flow and evapotranspiration, turbulent diffusion from chimneys and cooling towers, and related design issues.

635 Coastal Engineering I


Linear wave theory; wave generation by wind, analysis of fluid forces on floating and fixed coastal structures and modification of waves and currents by these structures, coastal processes and coastal sediment motion.

636 Environmental Fluid Mechanics


637 Project—Hydraulics

On demand. Variable credit. Hours to be arranged. Staff.

The student may elect a design problem or undertake the design and construction of special equipment to advance the fields of fluid mechanics, hydraulic engineering, or hydrology.

631 Flow and Containment Transport Modeling in Groundwater

Spring. 3 credits. Prerequisites: Mathematics 294 or equivalent, Engr 241 or experience in numerical methods and programming, and elementary fluid mechanics.


632 Analytical Hydrology

Spring. 3 credits. Prerequisite: CEE 331. W. H. Brutsaert.


633 Flow in Porous Media and Groundwater


Fluid mechanics and equations of single-phase and multiphase flow; methods of solution. Applications involve aquifer hydrodraulics, pumping wells; drought flows; infiltration, groundwater recharge; land subsidence; seawater intrusion, miscible displacement; transient seepage in unsaturated materials.
638 Hydraulics Seminar Spring. 1 credit. Open to undergraduates and graduates and required of graduate students majoring in hydraulics or hydraulic engineering.
Staff.
Topics of current interest in fluid mechanics, hydraulic engineering, and hydrology.

639 Special Topics in Hydraulics On demand. Variable credit.
Staff.
Special topics in fluid mechanics, hydraulic engineering, or hydrology.

[730 Coastal Engineering II Fall. 3 credits. Prerequisite: CEE 635. Not offered 1987–88.
3 lecs. L.-F. Liu.
Review of linear and nonlinear theories for ocean waves, applicability of different wave theories to engineering problems, wave-energy transmission, tsunamis, behavior of submerged and floating bodies, harbor agitations, ship waves.]

732 Unsteady Hydraulics Spring. 3 credits. Prerequisite: CEE 332 or permission of instructor. Offered alternate years.
J. A. Liggett.
The physical and mathematical basis for unsteady processes in hydraulic engineering, especially unsteady open-channel flow, Water hammer, unsteady sediment transport, long waves on large bodies of water, circulation. Numerical methods of solution.

734 Experimental Methods in Hydraulics On demand. 2 credits. Prerequisite: CEE 331.
G. H. Jirka.
Methods used in planning and conducting laboratory and field experiments in hydraulics and fluid mechanics. Dynamic similarity, modeling laws and applications. General operating principles and performance characteristics of measurement instruments. Specific devices for measurement of fluid properties, pressure, and flow. Data acquisition, processing, and signal analysis. Laboratory demonstrations.

735 Research in Hydraulics On demand. Variable credit.
Staff.
The student may select an area of investigation in fluid mechanics, hydraulic engineering, or hydrology. The work may be either experimental or theoretical in nature. Results should be submitted to the instructor in charge in the form of a research report.

Geotechnical Engineering

341 Introductory Soil Mechanics Spring. 3 credits.
2 lecs, 1 lab-tutorial. Staff.

640 Foundation Engineering Fall. 3 credits. Prerequisite: CEE 341.
3 lecs. optional tutorial. Staff.

641 Retaining Structures and Slopes Spring. 3 credits. Prerequisite: CEE 341.
3 lecs. optional tutorial. Staff.
Earth pressure theories. Design of rigid, flexible, braced, tied-back, slurry, and reinforced earth walls.

Stability of excavation, cut, and natural slopes. Design problems stressing application of course material under field conditions of engineering practice.

642 Highway Engineering (also Ag En 491) Spring. 3 credits. Prerequisites: junior standing in engineering, fluid mechanics, and soil mechanics (may be taken concurrently).
2 lecs, 1 lab. L. H. Irwin.
For description see Ag En 491.

643 Highway Materials and Pavement Design (also Ag En 692) Fall. 4 credits. Limited to engineering seniors and graduate students.
Prerequisites: CEE 341 and 642. Offered alternate years.
3 lecs. 1 lab. L. H. Irwin.
For description see Ag En 692.

647 Design Project in Geotechnical Engineering On demand. 1–6 credits. Students may elect to undertake a design project in geotechnical engineering. The work is supervised by a professor in the subject area.

648 Seminar in Geotechnical Engineering Fall, Spring. Staff.
Presentation and discussion of topics in current research and practice in geotechnical engineering.

649 Special Topics in Geotechnical Engineering On demand. 1–6 credits.
Staff.
Supervised study of special topics not covered in the formal courses.

740 Engineering Behavior of Soils Fall. 3 credits. Prerequisite: CEE 341.
3 lecs. Staff.

741 Rock Engineering Fall. 3 credits. Prerequisite: CEE 341 or permission of instructor. Recommended: introductory geology.
2 lecs, 1 lab. Staff.

742 Graduate Soil Mechanics Laboratory Fall. 3 credits. Prerequisite: CEE 470.
Staff.
Laboratory measurement of soil properties, from introductory to advanced techniques. Emphasis on sampling techniques, strength, compressibility, permeability tests. Critical evaluation of laboratory methodology. Design applications of laboratory-test results.

3 lecs. A continuation of CEE 640, with detailed emphasis on special topics in soil-structure interaction. Typical topics include lateral and pullout loading of deep foundations, pile group behavior, foundations for offshore structures, pile-driving dynamics, foundations for special structures.]

745 Soil Dynamics Spring. 3 credits. Prerequisite: permission of instructor.
3 lecs. Staff.
Study of soil behavior under dynamic loadings. Laboratory and field techniques for determining dynamic soil properties and strength liquefaction potential. Design of embankments and retaining structures under dynamic loading conditions.

746 Embankment Dam Engineering Spring. 2 credits. Prerequisites: CEE 641 and 741, or permission of instructor.
2 lecs. Staff.
Principles of analysis and design for earth and rockfill dams. Materials, construction methods, internal and external stability, seepage and drainage, performance monitoring, abutment and foundation evaluation. Introduction to tailings dams.

Staff.
Study of case histories in geotechnical engineering. Critical evaluation of successful and unsuccessful projects. Oral presentations and engineering report evaluation of each case.]

2 lecs. Staff.
Principles of analysis and design for earth and rock tunnels. Materials, construction methods, stability and support systems, deformations, and performance monitoring.]

749 Research in Geotechnical Engineering On demand. 1–6 credits.
Staff.
For the student who wants to pursue a particular geotechnical topic in considerable depth.

Environmental Quality Engineering

351 Environmental Quality Engineering Spring. 3 credits.
3 lecs. L. W. Lion.

352 Water Supply Engineering Fall. 3 credits. Prerequisite: CEE 351 or permission of instructor.
3 lecs. R. I. Dick.

651 Microbiology of Water and Wastewater Fall. 2 credits. Prerequisite: one semester of college chemistry.
2 lecs. J. M. Gossett.
Microbiological phenomena pertinent to analysis of natural systems and design of engineered microbial processes in pollution control.

653 Chemistry of Water and Wastewater Fall. 3 credits. Prerequisite: one semester of college chemistry or permission of instructor.
3 lecs. L. W. Lion.
Microchemical phenomena applicable to understanding, design, and control of water and wastewater treatment processes and to reactions in receiving waters. Topics include chemical thermodynamics, reaction kinetics, acid-base equilibria, mineral precipitation/dissolution, and electrochemistry. The focus of the course is on the mathematical description of chemical reactions relevant to engineered processes and natural systems, and the numerical or graphical solution of these problems.

654 Aquatic Chemistry Spring. 3 credits. Prerequisite: CEE 653 or Chemistry 287–288.
3 lecs. J. J. Bisogni.
Applications of concepts of chemical equilibria to natural aquatic systems. Topics include a review of...
655 Pollutant Transport and Transformation in the Environment Fall. 3 credits. Prerequisite: CEE 331. J. J. Bissogni, G. H. Jirka.
An introduction to the physical transport and chemical and biochemical transformation processes that govern the fate and distribution of pollutants in the environment. Advection and diffusive mass transport, turbulent diffusion and flow dispersion in water or atmosphere, dispersion in groundwater flow, homogeneous and heterogeneous chemical reactions and their effects on transport phenomena, air-water-soil interface transfer processes. Emphasis on physical mechanisms, with some applications to surface water, groundwater, and atmospheric transport and quality models.

656 Environmental Quality Management Fall; spring on demand. 3 credits (4 with approval of instructor). For upperclass or graduate students. May not be offered 1987-88.
An introduction to environmental quality management; nature, cause, and control of environmental problems; interaction of physical, social, and cultural environments. Emphasis on the interdependent social, economic, developmental, and environmental issues confronting society.

658 Sludge Treatment, Utilization, and Disposal Spring. 3 credits. Prerequisite: CEE 351 or permission of instructor.
Analysis of the quantities and quality of residues produced from municipal and industrial water-supply and pollution-control facilities as a function of process design and operational variables; alternatives for reclaiming or disposing of hazardous and nonhazardous residues with assessment of potential environmental impacts and factors influencing the magnitude of those impacts; fundamental factors influencing performance of treatment processes for altering sludge properties prior to reuse or ultimate disposal; and considerations in selection and integration of sludge-management processes to approach optimal design.

659 Environmental Quality Engineering Seminar Spring. 1 credit. Intended for all graduate students in environmental engineering; open to others with permission of instructor. R. I. Dick.
Presentation and discussion of current research and design projects in environmental engineering.

752 Water Quality Laboratory Fall. 1 credit. Enrollment limited. Prerequisites: Previous or concurrent enrollment in CEE 651 and 653 and permission of instructor. Staff.
Lab methods for analysis of pollutants in water and wastewater.

755 Environmental Engineering Processes I Fall. 3 credits (4 with lab). Prerequisite: Previous or concurrent enrollment in CEE 651 or permission of instructor.
Teoretical and engineering aspects of chemical and physical phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes and to their transformation in receiving waters. Analysis and design of treatment processes and systems. Pertinent laboratory studies.

756 Environmental Engineering Processes II Spring. 3 credits (4 with lab). Prerequisites: CEE 651 and 755, or permission of instructor.
Theoretical and engineering aspects of biological phenomena and processes applicable to the removal of impurities from water, wastewater, and industrial wastes and to their transformation in receiving waters. Biokinetic analysis and design of biological treatment processes. Pertinent laboratory studies.

757 Design Project in Environmental Engineering On demand. Variable credit. Prerequisite: CEE 351 or equivalent.
Staff.
The student chooses or is assigned a problem in the design of water or wastewater treatment, pollution-control facilities, or a laboratory project.

758 Environmental Engineering Research On demand. Variable credit. Prerequisites will depend on the particular investigation to be undertaken.
Staff.
For the student who wants to study a problem in greater depth than is possible in formal courses. Study may be in any combination of literature, laboratory, or computational research.

759 Special Topics in Environmental Engineering On demand. Variable credit.
Hours to be arranged. Staff.
Supervised study in special topics not covered in formal courses.

851 Thesis—Environmental Engineering Fall, spring. 1–12 credits. Students must register for credit with the professor at the start of each term.
A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

Transportation

361 Introduction to Transportation Engineering Spring. 3 credits.
A. H. Meyburg.
Introduction to the technological, economic, and social aspects of transportation. Emphasis on design and functioning of transportation systems and their components: Vehicle and system technology; traffic flow and control; terminal operations; supply-demand interactions; system planning, design, and management; and institutional issues.

660 Transportation Planning and Policy Fall. 3 credits.
A. H. Meyburg.
Public-sector planning and decision making for transportation. Problems of urban transportation and their implications. A systems-analysis approach to formulation of transportation policy at the local, regional, state, and federal levels. Consideration of urban-transportation planning models.

661 Decision Making in Engineering Systems Fall. 3 credits.
A. J. Richardson.
An examination of the decision-making behavior of managers and users of engineering systems. Such behavior will be addressed from various perspectives, including economic theories of choice, psychological theories of perception and choice, and consumer theories from marketing research. Emphasis will be on the reasons why individuals make specific decisions under particular circumstances. Some mathematical models of choice will be used to illustrate the concepts involved, but the primary emphasis will be on the concepts rather than on the mathematical theory. Throughout, the course will stress the managerial implications of the various components of the choice process.

663 Routing and Scheduling in Transportation Networks Fall. 3 credits. Prerequisite: OR&IE 320 or equivalent.
M. A. Turnquist.
Design of vehicle routes and schedules in transportation systems. Network flow algorithms. Fleet utilization problems. Routing and scheduling under time constraints, multijobflow routing problems, with applications to both passenger and freight systems.

664 Transportation Systems Design Spring. 3 credits. Prerequisite: CEE 361 or 663.
G. P. Fisher.
Advanced techniques for physical and operational design of transportation systems, including analytical modeling techniques underlying design criteria. Evaluation of alternative designs. Management and operating policies, including investment strategies. Facility location decisions, networks, and passenger and freight terminals.

668 Transportation System Operations and Management Fall. 3 credits. Prerequisite: CEE 361 or permission of instructor.
G. P. Fisher.
Planning and management problems in urban traffic systems and their solution. Transit operations planning. Demand forecasting. Consideration and evaluation of transportation system management alternatives such as high-occupancy vehicle lanes, parking prohibitions, auto-free zones, and pricing. Traffic implications of land-use development (site planning).

761 Transportation Design Project On demand. Variable credit.
Staff.
Design or feasibility study of transportation systems, supervised by one or more faculty advisers. Individual or group participation.

762 Transportation Research On demand. Variable credit.
Staff.
In-depth investigation of a particular transportation planning or engineering problem mutually agreed upon between the student and one or more faculty members.

763 Transportation Colloquium Fall, spring. 1 credit.
Lectures in various topics related to transportation planning and analysis.

764 Special Topics in Transportation Spring. 3 credits.
Staff.
Advanced subject matter not covered in depth in other regular courses. Topics for 1986–87 will be survey sampling methods and choice modeling for transportation demand analysis.

Structural Engineering

371 Structural Behavior Fall. 4 credits. Prerequisite: Engr 202. 3 lecs, one 2-hour lab, evening exams. Staff.

372 Structural Analysis Spring. 4 credits. Prerequisite: CEE 371.
3 lecs, one 2-hour lab, evening exams. Staff.

373 Design of Concrete Structures Fall. 4 credits. Prerequisites: CEE 372 or permission of instructor. Prerequisites or corequisites: CEE 376 and Engr 261. 2 lecs, 1 2-hour lab, design project. A. H. Nilson.
Behavior and design of reinforced concrete, prestressed concrete, and composite structures.
374 Design of Steel Structures  Spring. 4 credits. Prerequisite: CEE 373 or permission of instructor. Prerequisites or corequisites: CEE 376 and Engr 261. Evening exams, design project. T. Peköz. Behavior and design of steel structures. Introduction to the plastic analysis of frames.


376 Civil Engineering Materials  Fall. 3 credits. 2 lecs. 1 lab. K. C. Hover. Engineering properties of concrete, steel, wood, and other structural materials. Design characteristics and significance of test results of materials used in engineering works. Extensive laboratory testing and report writing.


671 Random Vibration  Fall. 3 credits Prerequisites: MA&E 326, CEE 779, and OR&E 260; or equivalent permission of instructor. Offered alternate years. M. D. Grigorou. Review of random process theory, simulation, and first-passage time. Linear random vibration: second-moment response descriptors and applications from fatigue; seismic analysis; and response to wind, wave, and other non-Gaussian load processes. Nonlinear random vibration: equivalent linearization, perturbation techniques, Fokker-Planck and Kolmogorov equations, itô calculus, and applications from chaotic vibration, fatigue, seismic analysis, and parametrically excited systems.

672 Fundamentals of Structural Mechanics  Fall. 3 credits. Prerequisite or corequisite: CEE 373. M. D. Grigorou. Theory of elasticity, energy principles, plate flexure, failure theories for structural design, beams on elastic foundation, finite-difference method, introduction to finite-element method.

673 Advanced Structural Analysis  Fall. 3 credits. Prerequisites: CEE 372 and computer programming. J. F. Abel. Matrix analysis of structures, computer programming of displacement (stiffness) method, use of interactive graphical analysis programs, solution methods, errors and accuracy, special analysis procedures, virtual work in matrix analysis, and introduction to nonlinear analysis.

674 Structural Model Analysis and Experimental Methods  Spring. 3 credits. 2 lecs. 1 lab. R. N. White. Dimensional analysis and similitude. Model materials, fabrication, loading, instrumentation techniques, and use of models in design. Experimental stress analysis. Models project.

675 Concrete Materials and Construction  Spring. 3 credits. Prerequisite: CEE 376 or equivalent. 2 lecs. 1 lab. K. C. Hover. Materials science, structural engineering, and construction technology involved in the materials aspects of the use of concrete. Cement chemistry and physics, mix design, admixtures, engineering properties, testing of fresh and hardened concrete, and the effects of construction techniques on material behavior. Lab assignments.

678 Low-Cost Housing Primarily for Developing Countries (also Architecture 614)  Fall. 3 credits. May not be offered 1987–88. 2 lecs. Conferences. F. O. State, H. Richardson. A broad, multidisciplinary approach covering technology, architecture, planning, sociology, economy, and cultural aspects. Students work in teams on a term project, applying their own discipline while being introduced to the problems and approaches of other disciplines. For example, engineering students investigate the technological aspects of the subject but also learn about other matters that influence technological decisions, such as cultural and economic factors.

680 Structural Engineering Seminar  Fall, spring. 1 credit. Limited to qualified seniors and graduate students. Staff. Presentation of topics of current interest in the field of structures.


775 Advanced Reinforced Concrete  Fall. 3 credits. Prerequisites: CEE 373 and 376 or equivalent. 3 lecs. A. H. Nilsson. General flexural analysis, deflection analysis, columns with uniaxial and biaxial bending, beam-supported slabs, flat-plate slabs, composite steel-deck slabs, ground-supported slabs, yield-line theory, limit-state analysis, footings, retaining walls, deep beams, tall buildings, and seismic design.


777 Advanced Behavior of Metal Structures  Spring. 3 credits. Prerequisite: CEE 374. W. McGuire. Behavior and design with emphasis on connections and design to resist nonlinear types of failure. Plate girders design.

778 Shell Theory and Design  Fall. 3 credits. Offered alternate years. P. Gergely. Fundamentals of practical shell theory. Differential geometry of surfaces; membrane and bending theory of shells; analysis and design of cylindrical shells, polygonal domes, and paraboloids.

779 Structural Dynamics and Earthquake Engineering  Spring. 3 credits. P. Gergely. Modal analysis, numerical methods, and frequency-domain analysis. Introduction to earthquake-resistant design.

780 Advanced Concrete Material Science  Fall. 3 credits. Prerequisites: CEE 376 or equivalent and CEE 675. 2 lecs. 1 lab. K. C. Hover. Advanced study of the chemistry, physics, and microstructure of cement and concrete. Investigation of cement manufacture and chemistry, hydration reactions and thermodynamics, effect of admixtures. Study of microstructure with scanning electron microscopy, gas adsorption, and porosimetry. Engineering properties and behavior include failure mechanisms and elastic and viscoelastic behavior.

782 Advanced Topics in Finite-Element Analysis  Fall. 3 credits. Prerequisite: CEE 772. Offered alternate years. J. F. Abel, A. R. Ingraffea. Lectures and colloquia on selected advanced topics and research in progress, including dynamics, nonlinear analysis, shells, fracture mechanics, fluid dynamics, and computer graphics.

783 Civil and Environmental Engineering Materials Project  On demand. 1–3 credits. Staff. Individual projects or reading and study assignments involving engineering materials.

784 Design Project in Structural Engineering  Fall, spring. Variable credit. Students may elect to undertake a design project in structural engineering. The work is supervised by a professor in this subject area.


786 Special Topics in Structural Engineering  On demand. Variable credit. Hours to be arranged. Staff. Individually supervised study or independent design or research in specialized topics not covered in regular courses.
880 Thesis—Structural Engineering Fall, spring. 1–2 credits. Students must register for credit with the professor at the start of each term. Geotechnical engineering: section 01; structural engineering: section 02.

A thesis research topic is selected by the student with the advice of the faculty member in charge and is pursued either independently or in conjunction with others working on the same topic.

Computer Science

The Department of Computer Science is in both the College of Arts and Sciences and the College of Engineering.

100 Introduction to Computer Programming (also Engr 100) Fall, spring, summer. 4 credits. Students who plan to take CS 101 or 102 and also CS 100 must take 101 or 102 first.

2 lecs, 1 rec (optional), 3 evening exams.

An introduction to elementary computer programming concepts. Emphasis is on techniques of problem analysis and algorithm and program development. The subject of the course is programming, not a particular programming language. The principal programming language is Pascal. The course does not presume previous programming experience. An introduction to numerical computing is included, although no college-level mathematics is presumed. Programming assignments are tested and run on interactive, stand-alone microcomputers.

100 Honors Introduction to Computer Programming (also Engr 100 Honors) Fall. 4 credits. Students who intend to major in computer science are encouraged (but not required) to elect this honors section. Students who do not intend to major in computer science are also welcome. Enrollment may be limited.

2 lecs, 2 recs, 2 evening exams.

An introduction to many of the important concepts in modern programming and programming languages: functional programming, recursive and higher-order procedures, symbolic hierarchical data, polymorphic functions, object-oriented programming, infinite data types, simulation, constraint systems, logic programming, and the interpretation of programming languages. Students learn to write programs in LISP.

101 The Computer Age Spring, summer. 3 credits. Credit is granted for both CS 100 and 101 only if 101 is taken first.

2 lecs, 1 rec. 1 evening exam.

An introduction to computer science and programming for students in nontechnical areas. The aims of the course are to make the student an intelligent consumer of what the computer has to offer and to develop an appreciation of algorithmic thinking. Topics include the history of computation, microtechnology, the retrieval and transmission of information; scientific computing; computer graphics, art, and music; robotics, natural language processing, and machine intelligence. Students become acquainted with the notion of an algorithm by writing several programs in Pascal and testing them on microcomputers. The amount of programming is about half of that taught in CS 100. Each student writes a term paper on some aspect of computing.

102 Introduction to Microcomputer Applications (also Ag En 102) Fall. 3 credits. Each lab section limited to 16 students. Not open to engineering students or students who have taken any prior computer courses at Cornell. Students in statutory colleges must enroll in Ag En 102.

2 lecs. 1 lab. 2 evening exams.

An introduction to the use of application packages on microcomputers. An attempt will be made to assess and demonstrate the capability and limitations of the current generation of personal computers through software for word processing, spreadsheets, databases, and other applications. The course will involve very little programming with high-level languages.

211 Computers and Programming (also Engr 211) Fall, spring, summer. 3 credits. Prerequisite: CS 100 or equivalent programming experience.

2 lecs, 1 rec, 2 evening exams.

Intermediate programming in a high-level language and introduction to computer science. Topics include program development, invariant relations, program structure, recursion, and introduction to data structures and analysis of algorithms. Pascal is the principal programming language.

222 Introduction to Scientific Computation (also Engr 222) Spring. 3 credits. Prerequisites: CS 100 and Mathematics 112, 122, or 192.

2 lecs, 1 rec, 3 evening exams.

An introduction to elementary numerical analysis and scientific computation. Students write FORTRAN programs and use high-quality numerical software packages to solve representative problems. Emphasis is on efficient, reliable, and stable methods for the basic problems of computational mathematics. Special topics include supercomputing and parallel computation.

280 Discrete Structures Fall, spring, 4 credits. Prerequisite: CS 211 or permission of instructor.

2 lecs. 3 credits.

Covers mathematical aspects of programming and computing. Topics will be chosen from the following: mathematical induction; logical proof; the predicate calculus; combinations and permutations; discrete mathematics, covering manipulation of sums, recurrence relations, and generating-function techniques; recursive functions; relations; partially ordered sets.

305 Social Issues in Computing Fall. 3 credits. Prerequisite: CS 100 or 101, or permission of instructor. Not offered every year.

2 lecs.

Economic, political, legal, and cultural impact of computers and computer-related technology; the role of computers in coordinating diversity and reducing disorder; the effect of computers on the individual; data banks and privacy; machine creativity and machine intelligence.

310 Data Structures Fall, spring, summer. 4 credits. Prerequisite: CS 280 or permission of instructor.

2 lecs, 2 evening exams.

Lists, trees, graphs, arrays, and other forms of data structure and their implementation. Relationship between language and data structure, emphasizing abstract data types. Dynamic storage allocation and memory management. Detailed study of searching and sorting methods. Analysis to determine the more efficient algorithm in a given situation.

314 Introduction to Computer Systems and Organization Fall, spring, summer. 4 credits. Prerequisite: CS 211 or equivalent.

2 lecs, 1 rec, 2 evening exams.

Introduction to the logical structure of digital computers. Topics include representation of information, machine-assembly language, the input-output channel, hierarchical storage systems, and microprogramming.

381 Introduction to Theory of Computing Fall. 4 credits. Prerequisite: CS 280 or permission of instructor.

3 lecs.

An introduction to modern theory of computing: automata theory, formal languages, and effective computability.

382 Introduction to Analysis of Algorithms Spring. 4 credits. Prerequisites: CS 310 and CS 381 or permission of instructor.

3 lecs.

Techniques used in the creation and analysis of algorithms. Combinatorial algorithms, computational complexity, NP-completeness, and intractable problems. Elements of parallel and distributed computation.

400 The Science of Programming Spring. 4 credits. Prerequisite: CS 280 or equivalent.

3 lecs. D. Gries.

The practical development of correct programs based on the conscious application of principles that are derived from a mathematical notion of program correctness. Besides dealing with conventional sequential programs, the course will cover implementations of abstract data types and contain an introduction to problems with concurrency. Issues in programming-language design that arise from program correctness are discussed. Programs will be written but not run on a computer.

411 Programming Languages and Logics Spring. 4 credits. Prerequisites: CS 310 and permission of instructor. Enrollment limited.

2 lecs.

An introduction to major styles of programming language, with emphasis on program explanations and logics of programming. Some study of language implementations. Topics include ways of defining languages (syntax, semantics), descriptive languages (pure Lisp), imperative languages (full Lisp, Pascal), and languages with assertive modes of expression (programming logics). One medium-sized project is assigned in Lisp; the computer is used for the project and for a variety of small assignments in programming and proving.

412 Introduction to Compilers and Translators Fall. 4 credits. Prerequisite: CS 314. Prerequisite or corequisite: CS 381. Not offered every year.

3 lecs.

Overview of the internal structure of modern compilers, with emphasis on implementation techniques. Topics covered include lexical scanning, simple parsing techniques, symbol-table manipulation, type-checking routines, and code generation for a small abstract machine. The course entails a compiler implementation project.

414 Systems Programming and Operating Systems Fall. 3 credits. Prerequisite: CS 314 or permission of instructor.

2 lecs, 2 evening exams.

An introduction to the logical design of systems programs, with emphasis on multiprogrammed operating systems. Topics include process synchronization, deadlock, memory management, input-output methods, information sharing, protection and security, and file systems. The impact of network and distributed computing environments on operating systems is also discussed.

415 Practicum in Operating Systems Fall. 2 credits. Prerequisite: CS 310. Corequisite: CS 414. 1lec.

The practical aspects of operating systems are studied through the design and implementation of an operating system kernel that supports multiprogramming, virtual memory, and various input-output devices. All the programming for the project is in a high-level language.

417 Computer Graphics (also Architecture 374) Spring. 3 credits. Prerequisite: CS 211. Not offered every year.

2 lecs. 1 lab.

An introduction to the principles of interactive computer graphics, including input techniques, display devices, display files, interactive graphic techniques, two- and three-dimensional computer graphics, perspective transformations, hidden-line and hidden-surface algorithms, parametric surfaces, light reflection models, and realistic image synthesis.
methods. Sensors and vision. Interfacing and real-time
control. Coordinate transformations for manipulator
kinematics. World modeling, task-level programming,
and task planning.

600 Computer Science and Programming Fall. 1 credit. Prerequisite: graduate standing in computer
science or permission of instructor.

1 lec.

An introduction to practical, modern ideas in
programming methodology. Covers style and
organization of programs, basic techniques for
presenting proofs of correctness of programs, and
the use of a "calculus" for the derivation of programs.

601 Introduction to Programming Logics Spring. 1 credit. Prerequisite: graduate standing in computer
science or permission of instructor.

1 lec.

Exploration of logics for reasoning about programs,
with special emphasis on data types and type theory.
Comparison with domain theory and logics of
computable functions. The Cornell proof development
system Nuprl may be used.

611 Advanced Programming Languages Fall. 4 credits. Prerequisite: CS 310 or permission of
instructor.

3 lecs.

Introduction to techniques for formal specification of
programming languages and data types, including
term-rewriting systems and Scott's denotational
techniques; use of formal semantics in comparing and
classifying languages; other advanced concepts,
including logic programming, functional programming,
and data-flow languages.

612 Translator Writing Spring. 4 credits. Prerequisite: CS 310 and 381, or permission of
instructor.

3 lecs.

Discussion of the models and techniques used in the
design and implementation of compilers. Topics include
lexical analysis in translators, compilation of arithmetic
expressions and simple statements, specifications of
syntax, algorithms for syntactic analysis, code
generation and optimization techniques, bootstrapping
methods, and translator writing systems.

613 Concurrent Programming and Operating Systems Principles Spring. 4 credits. Prerequisites: CS 414 and 600, or permission of
instructor.

3 lecs.

Advanced techniques in, and models of, concurrent
systems. Synchronization of concurrent processes;
parallel programming languages; deadlock;
verification.

614 Advanced Operating Systems Spring. 4 credits. Prerequisite: CS 414 or permission of
instructor.

2 lecs.

An advanced course in operating systems,
emphasizing contemporary research in distributed
systems. Topics may include processes and files
systems, virtual memory and segmentation,
addressing, scheduling, performance, protection,
communication mechanisms, and fault-tolerant systems.

615 Machine Organization Spring. 4 credits. Prerequisite: CS 314 or permission of instructor. Not

3 lecs]

616 VLSI Algorithms Spring. 4 credits.
Prerequisite: permission of instructor.

2 lecs.

This course focuses on the area-time performance of
VLSI computing systems. After a review of technology, a
model of computation for VLSI is defined. General area-
time lower-bound techniques are presented and
applied to specific problems such as integer arithmetic,
matrix operations, signal processing, sorting, and
graph problems. Design of parallel algorithms and
architectures is then discussed for the same class of
problems. Selected topics on computer-aided design
for VLSI, such as layout and testing, will also be
covered.

621 Matrix Computations Fall. 4 credits.
Prerequisites: Mathematics 411 and 431, or permission of
instructor.

3 lecs.

Modern algorithms. Stable and efficient methods
for solving systems of linear equations: Gaussian
elimination, Cholesky decomposition, bounded and structured systems, the QR factorization,
and least-squares methods. Theoretical and
unsymmetric eigenvalue problems and related
computational problems. The singular value
decomposition.

622 Numerical Optimization and Nonlinear Algebraic Equations Spring. 4 credits. Prerequisite: CS 621.

2 lecs.

Modern algorithms for the numerical solution of
multidimensional optimization problems and
simultaneous nonlinear algebraic equations. Emphasis
is on efficient, stable, and reliable numerical techniques
with strong global convergence properties: Newton
methods, modified Newton algorithms, and
trust-region procedures. Special topics may include
large-scale optimization, quadratic programming, and
numerical approximation.

632 Database Systems Fall. 4 credits.
Prerequisites: CS 310 and 432, or permission of
instructor.

2 lecs.

Discussion of data models and the implementation of
database systems, with an emphasis on current areas of
research. Topics include relational and object-oriented
systems. Concepts in data modeling and query
translation.

635 Automatic Text Processing and Information Retrieval Spring. 4 credits. Prerequisite: CS 310 or
permission of instructor.

2 lecs.

Modern methods for natural language text processing.
Topics include text analysis, storage and retrieval,
autometalics, word shape, and syntactic analysis,
language understanding systems, automatic
machine translation, and text generation and
translation.

643 Design and Analysis of Computer Networks Fall. 4 credits. Prerequisite: CS 414 or permission of
instructor. Not offered every year.

2 lecs.

A course in computer networks and layered protocols.
The following topics are presented: network-topology
design; data transmission within the physical layer;
data-link sliding-window protocols; network layer in
point-to-point long-haul networks, satellite and packet
radio networks and local networks; transport and
session layer protocols; internetworking. Selected
topics from the presentation and application layers will
also be discussed.

652 Sparse Matrix Theory: Combinatorial Algorithms and Numerical Computation Spring. 4 credits.
Prerequisites: CS 621 and 681, or permission of
instructor. Not offered every year.

2 lecs.

Efficient methods for solving large, sparse systems of
linear algebraic equations. Emphasis on the
combinatorial aspects of sparse problems; tools
include efficient graph algorithms and data structures
as well as more conventional numerical linear algebra.
Focus on direct as opposed to iterative methods. Much
of the course is concerned with ordering strategies for
Gaussian elimination and the resulting fill. Also
discussed are sparse least-squares problems and
large-scale programming.
655 Mathematical Foundations of Computer Modeling and Simulation (also Mathematics 655) Fall. 4 credits. Prerequisite: Mathematics 431 and 432, or the equivalent in both content and level of mathematical sophistication, or permission of the instructor. Not offered every year.

3 lecs.

This course has two parts, one purely mathematical and the other emphasizing applications. The first part is intended to introduce students to theoretical tools that are relevant to the study of robotics, solid modeling, and simulation. These tools will be drawn from the areas of real and complex algebraic geometry, topology, differential geometry, and differential equations. The second part of the course will provide applications that illustrate uses of the mathematics and point the way to needed further developments.

661 Robotics Fall. 4 credits. Prerequisites: CS 611 and 681, or permission of instructor. Not offered every year.

3 lecs.

Topics include homogeneous coordinates, manipulator movement, geometrical modeling, motion planning, compliance, computer vision, language issues, task planning, and pertinent mathematics.

662 Robotics Laboratory Fall. 1 credit. Prerequisite: graduate standing or permission of instructor. Not offered every year.

1 lab.

Introduction to the use of equipment and techniques in a modern robotics laboratory. Includes VAL programming, force sensing, compliant motion, and mechanical assembly.

671 Introduction to Automated Reasoning Fall. 4 credits. Prerequisites: CS 611 and 681 and Mathematics 581. Not offered every year.

3 lecs.

Methods to automate reasoning in mathematics, including decision procedures, theorem provers, and formal proof tactics. Various implemented systems such as Edinburgh LCF, Cornell's Nuprl, and the Boyer and Moore theorem prover may be studied.

681 Analysis of Algorithms Fall. 4 credits. Prerequisite: CS 381 or permission of instructor.

3 lecs.

Techniques used in the creation and analysis of algorithms. Complexity measures, advanced data structures, algorithms on graphs, lower bounds, reductions, and NP-complete problems. Special topics in analysis of algorithms. This course includes the contents of CS 382.

682 Theory of Computing Spring. 4 credits. Prerequisite: CS 381 or permission of instructor.

3 lecs.

Advanced treatment of theory of computation, computational-complexity theory, and other topics in computing theory.

709 Computer Science Graduate Seminar Fall, spring. 1 credit. S-U grades only. For staff, visitors, and graduate students interested in computer science. A weekly meeting for the discussion and study of important topics in the field.

711 Topics in Programming Languages and Systems Spring. 4 credits. Prerequisites: CS 381 and 611 or permission of instructor. Not offered every year.

2 lecs.

Topics are chosen at instructor's discretion.

712 Topics in Programming Languages and Systems Spring. 4 credits. Prerequisite: CS 612 or permission of instructor. Not offered every year.

2 lecs.

Topics are chosen at instructor's discretion.

713 Seminar in Operating Systems Fall, spring. 4 credits. Prerequisite: CS 613 or permission of instructor. Not offered every year.

Discussion of contemporary issues in operating systems.

714 Distributed Computing Spring. 4 credits. Prerequisites: CS 414 and an advanced systems course such as CS 613, 614, 632, or 643. Not offered every year.

2 lecs.

Principles of distributed computing and their application to fundamental problems such as deadlock detection. Considerable time will be devoted to modeling distributed computations, the theory of concurrency control, security and protection, and issues in fault tolerance (including consensus problems). Other topics may be optimal resource placement, cache management, the specification of distributed programs, and randomized protocols.

715 Seminar in Programming Refinement Logics Fall, spring. 4 credits. Prerequisite: permission of instructor.

Topics in programming logics, possibly including type theory, constructive logic, decision procedures, heuristic methods, extraction of code from proofs, and the design of proof-development systems.

719 Seminar in Programming Fall, spring. 4 credits. Prerequisite: CS 611 or permission of instructor. S-U grades only.

721 Topics in Numerical Analysis Fall. 4 credits. Prerequisite: CS 621 or 622 or permission of instructor.

Not offered every year.

2 lecs.

Topics are chosen at instructor's discretion.

722 Topics in Numerical Analysis Spring. 4 credits. Prerequisites: CS 621 or 622. Not offered every year.

2 lecs.

Topics are chosen at instructor's discretion.

729 Seminar in Numerical Analysis Fall, spring. 1-4 credits (to be arranged). Prerequisite: permission of instructor. S-U grades only.

[733 Topics in Information Processing Not offered 1987–88]

2 lecs.

Topics are chosen at instructor's discretion.

[734 Seminar in File Processing Fall. Credit to be arranged. Prerequisite: CS 733 or permission of instructor. Not offered 1987–88.)

739 Seminar in Text Processing and Information Retrieval Fall, spring. Credit to be arranged. Prerequisite: CS 635 or permission of instructor. S-U grades only.

749 Seminar in Systems Modeling and Analysis Fall, spring. 4 credits. Prerequisite: permission of instructor. Not offered every year.

Discussion of advanced topics in modeling and analysis of computer systems and networks, with emphasis on performance.

781 Topics in Analysis of Algorithms and Theory of Computing Fall. 4 credits. Prerequisites: CS 681 and 682, or permission of instructor. S-U grades only.

Not offered every year.

2 lecs.

Topics are chosen at instructor's discretion.

782 Topics in Analysis of Algorithms and Theory of Computing Spring. 4 credits. Prerequisites: CS 681 and 682, or permission of instructor. S-U grades only.

Not offered every year.

2 lecs.

Topics are chosen at instructor's discretion.

789 Seminar in Theory of Algorithms and Computing Fall, spring. 2-4 credits. Prerequisite: permission of instructor. S-U grades only.

790 Special Investigations in Computer Science Fall, spring. Prerequisite: permission of a computer science adviser. Independent research.

890 Special Investigations in Computer Science Fall, spring. Prerequisite: permission of a computer science adviser. S-U grades only. Master's degree research.

990 Special Investigations in Computer Science Fall, spring. Prerequisite: permission of a computer science adviser. S-U grades only. Doctoral research.

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Electrical Engineering

Required Courses

210 Introduction to Electrical Systems (also Engr 210) Fall, spring. 3 credits. Prerequisites or corequisites: Mathematics 293 and Physics 213.

3 lecs and optional tutorial sections. For description see Engineering Common Courses.

230 Introduction to Digital Systems Fall, spring. 4 credits.

2 lecs, 5 lab experiments. Introduction to basic analysis, design techniques, and methodology of digital systems. Boolean algebra, integrated circuit components used in digital-system implementation, codes and number systems, logic design of combinational circuits, logic design of sequential circuits, register transfer systems, and Von Neumann machines. A simple processor is designed in class. Laboratory experiments are performed on a Minotish computer using a logic simulator.

301 Electrical Signals and Systems I Fall. 4 credits. Prerequisites: a grade of at least C+ in Engr 210 and C in Mathematics 293 and 294.

3 lecs, 1 rec-computing session.

Linear time-invariant systems as models for active and passive networks, nodal analysis, convolution, unilateral Laplace transforms, relationships between steady-state system response and dynamical behavior, introduction to state variable analysis.

302 Electrical Signals and Systems II Spring. 4 credits. Prerequisite: EE 301.

3 lecs, 1 rec-computing session.

Continuous- and discrete-time signals and systems: Fourier series and transforms; bilateral Laplace and z transforms; applications of complex function theory and contour integration to system analysis; FFTs and DFTs; applications to modulation, filtering, and sampling.

303–304 Electromagnetic Waves and Fields I and II 303. Fall, 304. Spring. 4 credits each term. Prerequisites: grades of C or better in Physics 213 and 214, and Mathematics 294.

3 lecs, 1 rec-computing session.

Foundation and applications of electromagnetic theory, with emphasis on wave propagation, radiation, and the effects of the medium on wave transmission. Maxwell's equations, boundary conditions, electrostatics, Poynting theorem, electromagnetic basis of material properties and of circuits, plane waves in isotropic media, impedance concept and reflection, transmission lines, simple waveguides, resonant cavities, radiation and antenna systems, wave propagation in inhomogeneous and anisotropic media, and plasma and magnetic field effects. At the level of Fields and Waves in CommunicationElectronics, by Ramo, Whinnery, and Van Duzer, second edition.
306 Fundamentals of Quantum and Solid-State Electronics Spring. 4 credits. Prerequisites: Physics 214, Mathematics 294, and EE 303.

3 lecs, 1 rec-computing session.

Introduction to quantum mechanics and solid-state physics necessary for understanding lasers and modern solid-state electronic devices. Quantum mechanics is presented in terms of wave functions, operators, and solutions of Schroedinger's equation. Topics include the formalism and methods of quantum mechanics, the hydrogen atom, the structure of simple solids, energy bands, Fermi-Dirac statistics, and the basic physics of semiconductors. Applications studied include a simple metal, thermionic emission, and the p-n junction.

310 Probability and Random Signals Spring. 4 credits. Prerequisite: Mathematics 294.

3 lecs, 1 rec-computing session.

Introduction to modeling random phenomena and signals and applications of these models. Topics include concepts of probability, conditional probability, independence, random variables, expectation and random processes. Applications to problems of inference, estimation, and linear system response in communications, computers, control, and pattern classification.

315 Electrical Laboratory I Fall. 4 credits. Prerequisite: a grade of at least C+ in Engr 210.

Corequisite: EE 301.

2 lecs, 2 labs.

Basic electrical and electronic instrumentation and measurements involving circuits and fields of both active and passive elements; an experimental introduction to solid-state theory and devices. Introduction of the personal computer as a laboratory aid.

316 Electrical Laboratory II Spring. 4 credits. Prerequisites: EE 303 and 315.

2 lecs, 2 labs.

Laboratory studies of solid-state phenomena and devices; experiments illustrating the use of the personal computer in electrical engineering; laboratory studies of high-frequency phenomena and devices; and introduction to AC and DC machinery.

Computer Engineering

230 Introduction to Digital Systems Fall, spring. 4 credits.

For description see Required Courses.

424 Computer Methods in Electrical Engineering Fall. 4 credits. Prerequisite: EE 301.

3 lecs, 1 rec.

Numerical techniques every electrical engineer should know, presented in the context of circuit simulation. Solution of linear and nonlinear algebraic equations; integration; solution of ordinary differential equations; introduction to sparse-matrix methods; alternative forms of circuit-equation formulation. Starting from a program to simulate simple, linear passive, steady-state circuits, the instructor will add, and the students improve on, procedures that will finally result in a nonlinear transient integrated-circuit simulator that involves most of the techniques discussed in the lectures.

475 Computer Structures Fall. 4 credits.

Prerequisite: EE 230.

3 lecs, 1 lab.

Organization and design of digital computers. Hard-wired and microprogrammed control sequences, arithmetic hardware, and I/O systems; interrupt hardware, and memory organization. Each four-to-six-person laboratory group will design and construct a small digital computer. User-programmable logic devices will be employed in the laboratory for circuit implementation.

476 Microprocessor Systems Spring. 4 credits. Prerequisite: EE 475.

3 lecs, 1 lab.

System design using microprocessors. Hardware and software techniques employed for logic design, interfacing, instrumentation, and control. The use of development systems. User-programmable logic devices will be employed in the laboratory for interfacing the microcomputer to hardware.

539 VLSI Digital-System Design Fall and spring. 6 credits (must be taken both semesters). Prerequisite: EE 476 or equivalent.

Fall: 3 lecs, 1 computing sec; spring: 1 lec, 1 lab.

Custom VLSI design as seen by a system designer. Switches as logic devices, MOS logic design, two-phase clocking, stick diagrams, cell layout, regular structures, simulation, performance analysis, RC problems. System design for printed images, design for testing, semicustom design, systolic arrays, CAD design tools. A chip design project and design report are required for fall semester. CAD tools are used for interconnect, circuit and layout, timing, and performance, and the design report is revised during the spring semester.

541 Computer Processor Organization and Memory Hierarchy Fall. 4 credits. Prerequisite: EE 476 or permission of instructor.

Design and evaluation of processor and memory architectures are examined in the light of actual implementations of both large-scale and small-scale (microprocessor) systems. Topics include microprogramming, parallel and pipelined architectures, interleaved memories, cache and virtual memories, I/O processors, vector and array processors, and protection mechanisms.

542 Parallel Processing Spring. 3 credits. Prerequisite: EE 541 or permission of instructor.

3 lecs.

Computer architecture for parallel processors that are designed to provide a high computation rate for large scientific problems. Some primary emphasis on image processing and highly parallel VLSI-based systems. Other applications considered include signal processing and the solution of PDEs. Performance, processor architectures, algorithms, programming techniques, and fault tolerance will be discussed. Architecture types to be considered include binary-array processors, pipeline processors, inner-product computers, systolic arrays, and MIMD systems.

544 VLSI Architectures and Algorithms Spring. 3 credits. Prerequisite: EE 541 or permission of instructor.

3 lecs.

Since the advent of VLSI, the cost of processing logic is no longer a fundamental constraint on the design of computer architectures. Problems that once were computationally intractable can now be solved on arrays of thousands or even tens of thousands of processors. This course addresses the important question: What are the optimal VLSI structure and algorithms for specific classes of problems? The architectures we will examine include systolic arrays, mesh-connected processors, and data-flow computers; special attention will be given to problems that arise in real-time signal processing.

545 Computer Networks and Telecommunications I Fall. 3 credits. Prerequisite: EE 476 or permission of instructor.

3 lecs.

Methods and approaches in the design, analysis, and implementation of local area networks and public data networks; circuit switching, packet switching, carrier-sense multiple access with collision detection, token passing, ethernet, busses, and rings; roles and functions of protocols; layering and ISO models; CO/TT recommendations and SNA.

548 Computer Networks and Telecommunications II Spring. 3 credits. Prerequisite: EE 545 or permission of the instructor.

3 lecs.

Analysis and implementation of time- and space-division switching; architectural alternatives for telecommunication systems; blocking and nonblocking networks; voice- and data-switching requirements; integrated voice-data approaches; evolution toward the integrated services digital network (ISDN).

547 Computer Vision Fall. 3 credits. Prerequisite: EE 302 and EE 475 and permission of instructor.

3 lecs.

Computer acquisition and analysis of image data, with emphasis on techniques for robot vision. Computer vision is the construction of explicit meaningful descriptions of physical objects from images. This course will concentrate on descriptions of objects at three levels of abstraction: segmented images (images organized into subimages that are likely to correspond to interesting objects), geometric structures (quantitative models of image and world structures), and relational structures (complex symbolic descriptions of images and world structures). The programming of several computer-vision algorithms will be required.

548 Image Processing Spring. 3 credits.

For description see Circuits, Systems, and Signal Processing.

563 Communication Networks Fall. 4 credits.

For description see Communication and Information Systems.

Circuits, Systems, and Signal Processing

210 Introduction to Electrical Systems Fall, spring. 4 credits.

For description see Engineering Common Courses.

230 Introduction to Digital Systems Fall. 4 spring. 4 credits.

For description see Required Courses.

301 Electrical Signals and Systems I Fall. 4 credits.

For description see Required Courses.

302 Electrical Signals and Systems II Spring. 4 credits.

For description see Required Courses.

423 Analog Signal Processing Fall. 3 credits. Prerequisite: EE 302. 3 lecs.


424 Computer Methods in Electrical Engineering Fall. 4 credits.

For description see Computer Engineering.

425 Digital Signal Processing Fall. 4 credits. Prerequisite: EE 302. 3 lecs, 1 lab.

Fundamentals of signal analysis, review of Fourier, Laplace, and Z transforms. Sampling theory. Discrete Fourier transform properties and computation (FFT). Digital filter design; the approximation problem for FIR and IIR filters, the realization problem—finite word-length limitations and filter structures.
426 Applications of Signal Processing  Spring 3 or 4 credits. Prerequisites: EE 425.
Applications of signal processing, including signal analysis, filtering, and signal synthesis. The course is laboratory-oriented and includes both assigned tasks and individual student projects. Design is done with signal-processing hardware and by computer simulation. Topics include filter design (principally digital filtering) and spectral analysis as well as speech coding, speech processing, digital recording, adaptive noise cancellation, and digital signal synthesis.

521 Theory of Linear Systems  Fall 4 credits. Prerequisite: EE 302 or permission of instructor. Recommended: a good background in linear algebra and differential equations.

522 Theory of Nonlinear Systems  Spring 4 credits. Prerequisites: EE 521 or a solid background in linear algebra strongly recommended but not required. A fairly rigorous introduction to nonlinear systems, including nonlinear differential equations (existence and uniqueness theorems), flows, stability of equilibrium and periodic orbits, Lyapunov functions; the Circle Criterion and Popov’s Criterion; the Poincaré-Bendixson Theorem.

526 Advanced Signal Processing  Spring 4 credits. Prerequisite: EE 425. 3 lecs, 1 lab.
Sampling and signal reconstruction. Approximation theory with $L_p$ and Chebyshev norms. Linear inversion theory. Exponential signal modeling; spectral estimation.

548 Image Processing  Spring 3 credits. Prerequisites: EE 302, 423, and 475; or permission of instructor.
Image formation and perception, computer representation of images, image enhancement and restoration, image reconstruction from projections, scene understanding, image analysis, and computer architectures for image processing. The programming of several computer-vision algorithms will be required.

574 Adaptive Parameter Estimation Theory  Fall 3 credits. For description see Power and Control Systems.

679 Advanced Topics in Systems and Control 1–3 credits.
For description see Power and Control Systems.

Communication and Information Systems

310 Probability and Random Signals  Spring 4 credits. For description see Required Courses.

467 Introduction to Communication Systems  Fall 4 credits. Prerequisites: EE 302 and 310 or equivalents.

545 Computer Networks and Telecommunications I  Fall 3 credits. For description see Computer Engineering.

546 Computer Networks and Telecommunications II  Spring 3 credits. For description see Computer Engineering.

561 Error-Control Codes  Fall 3 credits. Prerequisite: EE 302 or EE 521 or equivalent. A strong familiarity with linear algebra is assumed.
An introduction to the theory of error-control codes: linear block codes, convolutional and other trellis codes; Hamming codes, minimum-distance, standard array, minimum-distance decoding, cyclic codes; New codes from old and the dual code. The Hamming sphere packing and the Singleton bound for error-correcting codes. Algebra: groups, rings, and fields with applications to error correction. System design and decoding of Bose-Ray-Chaudhuri-Hocquenghem (BCH) and Reed-Solomon (RS) codes. Algebraic description of binary convolutional codes. Decoding algorithms and construction of Euclidean distance trellis codes.

562 Fundamental Information Theory  Spring 3 credits. Prerequisite: EE 310 or equivalent.
Fundamental results of information theory with application to storage, compression, and transmission of data. Entropy, channel capacity, and other information measures. Block and variable-length codes. Channel capacity and rate-distortion functions. Coding theorems and converses for classical and multiterminal configurations. Gaussian sources and channels.

563 Communication Networks  Fall 4 credits. Prerequisite: EE 310 or permission of instructor.

564 Decision Making and Estimation  Spring 4 credits. Prerequisite: EE 310 or equivalent.
An introduction to those methods of making rational decisions and inferences and of forming estimates that are central to problems of communications, detection, and pattern classification. Topics to be covered include utility theory; Bayes, minimax, and Neyman-Pearson decision theories. Bayes and maximum-likelihood point estimation; Cramer-Rao bound, efficient, and consistent estimation. Special topics (such as spectral and density estimation, robustness) as time permits.

566 Queuing Networks  Spring 4 credits. Prerequisite: EE 310 or equivalent.

568 Communication Systems II  Spring. 4 credits. Prerequisite: EE 467 or equivalent.
An introduction to coherent digital communications. Discrete representations for continuous signal sets such as pulse-code modulation (PCM), delta modulation (DM), and differential pulse-code modulation (DPCM), and companding and Huffman coding. Digital modulator-demodulators (MODEMs): signal sets such as phase shift keying (PSK), frequency-shift keying (FSK), maximum-a-posteriori (MAP) and maximum-likelihood (ML) receivers, probability of error, symbol-timing and carrier-tracking loops, and intersymbol interference (ISI). Coded systems: convolutional codes, Viterbi and sequential decoding, Multiplexing: time division (TDM), frequency division (FDM), code division (CDM). Spread spectrum.

664 Foundations of Inference and Decision Making  Spring. 3 credits. Prerequisite: A course in probability and some statistics, or permission of instructor.
An examination of methods for characterizing uncertainty and chance phenomena and for transforming information into decisions and optimal systems. Discussion of the foundations of inference includes topics drawn from comparative probability, interval-valued probability, quantitative probability, relative frequency interpretations, computational complexity, randomness, classical probability and invariance, induction, and subjective probability.

668–669 Random Processes in Electrical Systems  Fall 668, Spring 669. 3 credits each term. Advanced topics in the general area of randomness and uncertainty and their relevance to the analysis and design of electrical systems.

Power and Control Systems

451–452 Computer-Aided Analysis of Electric Power Systems I and II  451, fall; 452, spring. 4 credits each term. Prerequisites: EE 302. 3 lec-rec, 1 lab-computing session.
The so-called second-generation and third-generation simulation tools and their computer implementation for large-scale circuits and systems. Modeling of digital power systems for load-flow, stability, economic dispatch, and optimal-power-flow studies. Special properties of electric power systems that enhance the efficiency of simulation tools used for their analysis. The Kettering Power System Laboratory’s digital computer is used as a dynamic laboratory.

471 Feedback Control Systems  Fall 4 credits. Prerequisites: EE 302 or M&AEE 326 or permission of instructor.
3 lecs, open lab. C. R. Johnson, Jr. Analysis techniques, performance specifications, and analog feedback-compensation methods for single-input, single-output, linear, time-invariant systems. Laplace transforms and transfer functions are the major mathematical tools. Design techniques include PID, root-locus, frequency response, and algebraic pole placement. Computer-aided design laboratory examines modeling and control of a computer-simulated dynamic industrial process.

555 Advanced Power Systems Analysis I  Fall 3 credits. Prerequisites: EE 302 and concurrent registration in 451, or permission of instructor. Not offered 1987–88.
Analysis of power-system components. These components include rotating machines and systems for excitation control, automatic voltage regulation, boiler-turbine control, and speed regulation, as well as ancillary three-phase networks. Emphasis on derivation of mathematical models from first principles, development of algorithms for the formation of applicable network matrices.

556 Advanced Power Systems Analysis II  Spring. 3 credits. Prerequisite: EE 555 or permission of instructor. Not offered 1987–88.
projects emphasize applications of integrated circuits and design concepts discussed in the lectures. Models for active devices and noise sources are developed and applied to the design, analysis, and application of common analog and digital integrated circuits such as high-frequency amplifiers, operational amplifiers; D/A and A/D converters; ECL, TTL, and CMOS logic; and semiconductor memory. At the level of Analysis and Design of Digital Integrated Circuits, by Hodges and Jackson, and Analysis and Design of Analog Integrated Circuits, by Gray and Meyer.

435-436 *Semiconductor Electronics* 
435, fall; 436, spring. 4 credits each term; may be taken for 3 credits without laboratory only with permission of instructor. Prerequisites: EE 306 and 316, or equivalent. 3 lecs, 1 lab. Semiconductor-device electronics from point-contact transistor to megabit dynamic random-access memories and beyond. Fall term: electronic characteristics of semiconductors, electron and hole transport, band diagrams, optical properties, and interfaces, silicon pn-junction diode, bipolar transistor, junction growth, diffusion, ion implantation, oxidation; transistors. Spring term: Schottky diode, compound semiconductor-metal—semiconductor-field-effect transistor and reverse modulation-doped field-effect transistor; integrated MOS circuit blocks. silicon bipolar circuit blocks. compound semiconductor field-effect transistor circuit blocks; and compound semiconductor modulation-doped field-effect transistor circuit blocks; limitations of silicon and compound semiconductor circuits; integrated device and circuit characterization; computer simulation of semiconductor devices; reliability of integrated electronics.

533 *Solid-State Microwave Devices and Circuits I* 
Fall. 4 credits. For description see Fields, Waves, and Antennas.

534 *Solid-State Microwave Devices and Circuits II* 
Spring. 4 credits. For description see Fields, Waves, and Antennas.

535 *Semiconductor Physics* 
Fall. 4 credits. Prerequisites: EE 304 and 407, or permission of instructor. Offered alternate years. Not offered 1987-88. 3 lecs. Foundations of semiconductor physics for the description of carrier transport and optical characteristics of semiconductor materials and structures. Crystalline energy-band structures, statistics, effective mass theorem, classical transport, scattering, high-field transport, quantum transport, optical absorption and reflection, photoconductivity, light generation, deep levels, and surface and interface phenomena. On or above the level of Semiconductor Physics, by K. Seeger.

536 *VLSI Technology* 
Spring. 4 credits. Prerequisite: EE 435 or permission of instructor. 3 lecs, 1 lab. Processing technology for silicon MOS and bipolar integrated circuits, especially VLSI. Lithography, crystal growth, diffusion, ion implantation, oxidation, chemical-vapor deposition, evaporation, sputtering, epitaxy, etching, process integrations, and process simulations. At the level of VLSI Technology, edited by S. M. Sze.

539 *VLSI Digital-System Design* 
Fall and spring. 6 credits. For description see Computer Engineering.

[636 *Advanced Solid-State Devices*] 
Spring. 3 credits. Prerequisites: EE 535 or equivalent. 3 lecs. Offered alternate years. Not offered 1987-88. A fundamental analysis of device operation, with emphasis on operational limits. Effects of band structure, low- and high-field transport characteristics, secondary ionization, transferred electron effects, and the details of joint and contact technology relevant to devices at the limits of microfabrication technology. Applications to microwave amplification, generation, and broadband optical detection, including stability, nonlinearity, and noise.

638 *Advanced Semiconductor Devices and Processes* 
Fall. 4 credits. Prerequisites: EE 535, EE 636, or permission of instructor. 3 lecs, special project or term paper. Advanced topics in solid-state electronic-device physics, fabrication methods, and materials for high-speed circuits, silicon VLSI, and semiconductor technologies. Concepts developed in EE 535 and 636 are applied to current state-of-the-art topics. On the level of IEEE Transactions on Electron Devices, Journal of Applied Physics, and current conference proceedings.

**Quantum and Optoelectronics**

306 *Fundamentals of Quantum and Solid-State Electronics* 
Spring. 4 credits. For description see Required Courses.

407 *Quantum Mechanics and Applications* 
Fall. 4 credits. Prerequisite: EE 306. 3 lecs, 1 tec. Fundamentals of quantum mechanics: theory of angular momentum, time-independent and time-dependent perturbation theory and interaction of radiation with matter. Elementary considerations of the structure of atoms, molecules, and solids. Applications to semiconductors, spectroscopy of atoms and molecules, and lasers.

430 *Lasers and Optical Electronics* 
Fall. 3 or 4 credits. Prerequisite: EE 306 or equivalent. 3 lecs; 1 optional lab. An introduction to the operation of stimulated-emission devices such as lasers and devices based on linear and nonlinear optics. Material covered includes diffraction-limited optics, propagation of laser beams, optical cavities, interaction of radiation with matter, physics of laser operation, laser design, and application of coherent radiation to nonlinear optics, communication, and research. Laboratory presents an opportunity to work with a variety of lasers and processes discussed in lecture.

437 *Fiber and Integrated Optics* 
Spring. 3 or 4 credits. Prerequisite: EE 306. 3 lecs, 1 lab—computer session. The physical principles of fiber optics, integrated optics, and optical applications to communication and sensing. Topics include propagation through lossy waveguides, dispersion and bandwidth limitations, optical sources based on semiconductors, detectors and noise, modulation techniques, nonlinear effects in fibers, and optical sensors.

531 *Quantum Electronics I* 
Fall. 4 credits. Prerequisites: EE 306 and 407 or Physics 443. 3 lecs, 1 computing session. A detailed treatment of the physical principles underlying lasers, related fields, and applications. Topics include the interaction of radiation and matter, including emission, absorption, scattering, and macroscopic material properties; theory of the laser, including methods of achieving population inversions, output power of amplifiers, gain, dispersive effects, and laser oscillation spectrum.

532 *Quantum Electronics II* 
Spring. 4 credits. Prerequisites: EE 531 or permission of instructor. 3 lecs, 1 lab—computing session. A continuation of EE 531. Topics include spectroscopy of atoms, molecules, and ions in crystals as examples of laser media; density matrix, nonlinear optics and optical processes; theory of coherence, integrated optics and optical communication.

535 *Semiconductor Physics* 
Fall. 4 credits. For description see Solid-State Electronics.
Electrical Engineering 287

Plasmas and Large-Scale Fluids


- 2 lecs. 1 lab.

484 Introduction to Controlled Fusion: Principles and Technology (also M&A 559 and NS&E 484) Spring. 3 credits. Prerequisites: EE 301 and 303, or permission of instructor. Intended for seniors and graduate students.

- 3 lecs.
- For description see NS&E 484.

487 Antennas and Propagation Fall. 3 credits. For description see Fields, Waves, and Antennas.

581 Introduction to Plasma Physics (also A&EP 606) Fall. 4 credits. First-year graduate-level course: open also to exceptional fourth-year students with permission of instructor. Prerequisites: EE 303 and 304 or equivalent.

- 3 lecs.

582 Advanced Plasma Physics (also A&EP 607) Spring. 4 credits. Prerequisite: EE 581.

- 3 lecs.
- For description see A&EP 607.

583 Electrodynamics Fall. 4 credits. For description see Fields, Waves, and Antennas.


586 Solar Terrestrial Physics (also Astronomy 576) Spring. 3 credits. High-latitude ionosphere; electric fields in the polar cap and auroral zone; particle precipitation and the aurora; magnetic and ionospheric storms; plasma instabilities in the ionosphere and magnetosphere; structure and physical processes in the sun, solar corona, and solar wind, interactions between the solar wind and the earth's magnetosphere, trapping, acceleration, and drift of energetic particles in the magnetosphere.

588 Electromagnetic Wave Propagation II Spring. 3 credits. Prerequisites: EE 487 and 581, or permission of instructor.

- 3 lecs.
- Full-wave solutions of the wave equations; interactions between particles and waves; scattering of radio waves from random fluctuations in refractive index, scatter propagation, incoherent scatter from the ionosphere and its use as a diagnostic tool; scattering from unstable plasma waves; pulse compression and other radar probing techniques; radio-star and satellite scintillations and their use as diagnostic tools.

589 Magnetohydrodynamics Spring. 3 credits. Prerequisite: EE 581.

- 3 lecs.
- The theory of ideal and nonideal magnetohydrodynamical equations with emphasis on application to controlled thermonuclear fusion. Topics: derivation and domain of applicability, invariants, waves, equilibrium and normal-mode stability analysis, continuous spectrum; energy principle and applications to confinement geometries; nonideal effects, resistivity, finite Larmor radius stabilization. Selected additional topics such as dynamo theory or MHD turbulence.

681 Kinetic Theory (also A&EP 761) Fall. 3 credits. Prerequisite: EE 407, Physics 561, or permission of instructor.

- 3 lecs.


- 3 lecs.
- Single-particle motion, multiple-time-scale analysis and ponderomotive effects, weakly nonlinear waves and solitons, nonlinear Vlasov phenomena, quasilinear theory, resonance broadening and resonant mode-mode coupling, statistical theorems of plasma turbulence, recent developments in stochasticity and chaos in plasma physics.

Fields, Waves, and Antennas

303–304 Electromagnetic Fields and Waves 303, fall; 304, spring. 4 credits each semester. For description see Required Courses.

487 Antennas and Propagation Fall. 3 credits. Prerequisite: EE 304 or equivalent.

- 3 lecs.

Aspects of antenna theory and design; thin-wire aperture and horn antennas; computer-aided design of antennas; path-loss and link-margin calculations; diffraction, refraction and ducting in the troposphere; propagation of radio waves and cold plasma waves in the ionosphere and magnetosphere; Alfvén, whistler-mode, and hybrid waves.

533 Solid-State Microwave Devices and Circuits I Fall. 4 credits. Prerequisite: EE 304.

- 2 lecs. 1 lab.

Theoretical and experimental studies of circuits, amplifiers, oscillators, detectors, receivers, and electrical noise at microwave frequencies. Typical topics: one- and two-port resonators; negative resistance amplifiers; oscillator load characteristics, locking and stabilization; microwave amplifiers; intermodulation effects; resistor and shot noise; noise figure; FM noise. Laboratory. Makes use of the H-P 8510A Automatic Network Analyzer and other microwave equipment.

534 Solid-State Microwave Devices and Circuits II Spring. 4 credits. Prerequisites: EE 533 and 435–436.

- 2 lecs. 1 lab.

Basic theories of the microwave operation of solid-state devices. The range of devices studied covers active two- and three-terminal devices, such as IMPATT, Gunn, Barff, and tunnel devices, and MESFET, MODFET, and bipolar transistors. In addition, passive devices such as pin-switching diodes, varactor diodes, and detector diodes are studied. Studies of experimental methods of characterizing these devices include the use of advanced instrumentation such as the H-P 8510A Automatic Network Analyzer and other microwave equipment.

583 Electrodynamics Fall. 4 credits. Prerequisite: EE 304 or equivalent.

- 3 lecs.

Maxwell's equations, electromagnetic potentials, integral representations of the electromagnetic field, Green's functions. Special theory of relativity, Liénard-Wiechert potentials, radiation from accelerated charges, Cerenkov radiation. Electrodynamics of dispersive dielectric and magnetic media. At the level of Classical Electrodynamics, by Jackson.

584 Microwave Theory Spring. 4 credits. Prerequisite: EE 304 or equivalent.

- 3 lecs. 1 rec.


688 Advanced Electromagnetic Wave Propagation and Scattering Spring. 3 credits. Prerequisite: EE 487 or permission of instructor.

- 3 lecs.

Full-wave solutions of the wave equations, interactions between particles and waves, scattering of radio waves from random fluctuations in refractive index, scatter propagation, incoherent scatter from the ionosphere and its use as a diagnostic tool, scattering from unstable plasma waves, pulse compression and other radar probing techniques, radio-star and satellite scintillations and their use as diagnostic tools.

General

315 Electrical Laboratory I Fall. 4 credits. For description see Required Courses. 1-3 credits.

316 Electrical Laboratory II Spring. 4 credits. For description see Required Courses. 2 lecs.

442 Fundamentals of Acoustics (also T&AM 666) Spring. 3 credits.

- 3 lecs. biweekly lab.

For description see T&AM 666.

480 Thermal, Fluid, and Statistical Physics for Engineers Spring. 3 credits. Prerequisite: Physics 214.


491–492 Senior Project 491, fall; 492, spring. 1–4 credits.

- Individual study, analysis, and, usually, experimental tests in connection with a special engineering problem chosen by the student after consultation with the faculty member directing the project. An engineering report on the project is required.

591–599 Graduate Topics in Electrical Engineering 1–3 credits.

- Seminar, reading course, or other special arrangement agreed on by the students and faculty members concerned.
961–962 Electrical Engineering Colloquium Fall, 962, spring, 1 credit each term. For students enrolled in the graduate Field of Electrical Engineering. Lectures by staff, graduate students, and visiting authorities. A weekly meeting for the presentation and discussion of important current topics in the field. Report required.

963–964 Electrical Engineering Design 963, fall; 964, spring. 1–3 credits each term. For students enrolled in the M. Eng. (Electrical) degree program. Uses real engineering situations to present fundamentals of engineering design.

965–966 Graduate Topics in Electrical Engineering 1–3 credits. Seminar, reading course, or other special arrangement agreed upon by the students and faculty members concerned.

791–792 Thesis Research 791, fall; 792, spring. 1–15 credits. For students enrolled in the master's or doctoral program.

Geological Sciences

Freshman and Sophomore Courses

101 Introductory Geological Sciences Fall, spring. 3 credits. Prerequisite: Geol 101 or permission of instructor.
2 lecs, 1 lab, field trips, evening exams in the fall term. Fall. W. M. White; spring. W. B. Travers. In order to better harmonize human endeavor with the natural earth we need to know what is natural on earth. This course teaches observation and understanding of landscape, including coasts, rivers, valleys, and glaciated regions, the genesis of earthquakes, volcanoes, and mountains; evidence for the drifting of continents and its consequences; and the origin, discovery, and development of mineral and water resources. The lab teaches use of topographic and geologic maps and recognition of minerals and rocks and includes field trips to Cascadilla Gorge, Fall Creek, and Enfield Glen.

102 Introduction to Historical Geology Spring. 3 credits. Prerequisite: Geol 101 or permission of instructor.
2 lecs, 1 lab, evening exams. J. L. Cisne. A continuation of Geol 101. History of the earth and life in terms of evolutionary processes. The geologic record, its formation, and interpretation of earth history. Introduction to the evolution of life and to fossils and their use in reconstructing past environments and dating rocks.

107 Frontiers of Geology I Fall. 1 credit. May be taken concurrently with or after Geol 101.
1 lec. J. L. Cisne and staff. Lectures by members of the department on selected fundamental topics of current interest, such as continental drift and related tectonic processes, volcanoes, earthquake prediction, natural energy sources, and mineral resources.

108 Frontiers of Geology II Spring. 1 credit. May be taken concurrently with or after Geol 101 or 102.
1 lec. J. L. Cisne and staff. Lectures by members of the department on selected fundamental topics of current interest, such as plate tectonics, the evolution of mountain belts and island arcs, the deep structure of continents, ecology and evolution of fossil organisms, sea-level changes, and fossil fuels.

201 Introduction to the Physics and Chemistry of the Earth (also Engr 201) Spring. 3 credits. Prerequisites: Mathematics 191 or 193, Physics 112, and Chemistry 207.
2 lecs, 1 rec, lab, or field trip. L. M. Cathles. For description see Engineering Common Courses.

202 Environmental Geology Spring. 3 credits. O. E. Karlis.
This course teaches observation and understanding of the earth. (also Engr 201) fossil fuels. The evolution of fossil organisms, sea-level changes, and arcs, the deep structure of continents, ecology and areas of current interest, such as plate tectonics, the evolution of mountain belts and island arcs, the deep structure of continents, ecology and evolution of fossil organisms, sea-level changes, and fossil fuels.

210 Introduction to Field Methods in Geological Sciences Fall. 2 credits. Prerequisite: Geol 101 or coregistration. Weekly field sessions. J. M. Bird.
An introduction to the methods by which rocks are used as a geological database. Students will be introduced to the field methods used in the construction of geologic maps and cross sections and to systematic description of stratigraphic sections. Field and laboratory sessions are held on Saturday mornings until Thanksgiving, during most of these weeks there will also be one additional lecture.

212 Internship Field Trip January intersession.
1 credit. Prerequisite: Geol 101 or 201 or equivalent and permission of instructor. Travel and subsistence expenses to be announced.
A trip of one week to ten days in an area of interesting geology in the lower latitudes. Interested students should contact the instructor during the early part of the fall semester.

214 Western Adirondack Field Course Spring. one week at the end of the semester. 1 credit. Students should be prepared for overnight camping and will have to pay for their own meals.
W. A. Bassett.
Field mapping methods, mineral and rock identification, examination of Precambrian metamorphic rocks and lower Paleozoic sediments, talc and zinc mines.

Junior, Senior, and Graduate Courses

Of the following, the core courses Geol 326, 355, 356, 375, and 388 may be taken by those who have successfully completed Geol 201 or the equivalent or who can demonstrate to the instructor that they have adequate preparation in mathematics, physics, chemistry, biology, or engineering.

326 Structural Geology Spring. 4 credits. Prerequisite: Geol 101 or 201, or permission of instructor.
3 lecs, 1 lab, field trips. R. W. Allmendinger.
Nature and origin of deformed rocks at microscopic to macroscopic scales, with emphasis on structural geometry and kinematics.

355 Mineralogy Fall. 4 credits. Prerequisite: Geol 101 or 201, or permission of instructor.
2 lecs, 2 labs, assigned problems and readings. W. A. Bassett.
Examination of minerals by hand-specimen properties and optical microscopy. Geological setting, classification, crystal structures, phase relations, chemical properties, and physical properties of minerals are studied. X-ray diffraction is introduced.

356 Petrology and Geochemistry Spring. 4 credits. Prerequisite: Geol 325.
2 lecs, 2 labs, 1 field trip, assigned problems and readings. R. W. Kay.
Principles of phase equilibrium as applied to igneous and metamorphic systems. Description, classification, chemistry, origin, regional distribution, and dating of igneous and metamorphic rocks. Geochemical distribution of trace elements and isotopes in igneous and metamorphic systems. The petrological evolution of the planets.

375 Sedimentology and Stratigraphy Fall. 4 credits. Recommended. Geol 102 or 201.
3 lecs, 2 labs, field trips. J. L. Cisne, T. E. Jordan.

388 Geophysics and Geotectonics Spring. 4 credits. Prerequisites: Mathematics 192 and Physics 213 or equivalent.
3 lecs, 1 lab. B. L. Isacks.
Global tectonics and the deep structure of the solid earth as revealed by investigations of earthquakes, earthquakes waves, the earth's gravitational and magnetic fields, and heat flow.

410 Field Geology Summer. 6 credits.
Prerequisites: Geol 326 or permission of instructor.
Six weeks at the Sierra Madre Field Camp, Wyoming. Fee, $1,650.
W. B. Travers and staff.
Field mapping techniques in igneous, metamorphic, and sedimentary rock, using topographic maps and air photos. The structural geology, petrology, geology, and stratigraphy of parts of the Ovathrust Belt, Yellowstone-Jackson region, Hanna Coal Basin, Wind River, and Bearthcot Mountains. The study will be the joint project of the Cornell, Yale, and Harvard departments of geological sciences.

412 Experiments and Techniques in Earth Sciences Spring. 2 credits. Prerequisites: Physics 213 and Mathematics 192 or equivalents, or permission of instructor.
S. Kaufman.
Laboratory and field experiments chosen in accordance with student interest. Familiarization with instruments and techniques used in earth sciences. Independent work is stressed.

424 Petroleum Geology Spring. 3 credits. Recommended: Geol 326.
2 lecs, 1 lab. W. B. Travers.
Introduction to hydrocarbon exploration and development. Exploration techniques, including geological use of well logs, fluid pressures, seismic-reflection methods, gravity, and magnetic measurements to map subsurface structures and stratigraphy. Petroleum origin and migration. Dispersal systems and depositional patterns of petroleum reservoirs. Economics of exploration, leasing, drilling, and production, and estimates of petroleum reserves, including tar sands and oil shales.

431 The Earth's Crust: Structure, Composition, and Evolution Fall. 3 credits. Prerequisites: Geol 356 and 388.
L. D. Brown.
Structure and composition of the crust from geophysical observations, analysis of xenoliths, and extrapolation of geological laboratory data. Radiosopic considerations. The nature of the crust-mantle boundary. Thermal and rheological structure of the crust. Oceanic versus continental crust. Origin and evolution of oceanic and continental crust.

432 Digital Processing and Analysis of Geophysical Data Spring. 3 credits. Prerequisites: Geol 487 or equivalent. Offered alternate years.
L. D. Brown.

434 Interpretation of Seismic Reflection Data Spring. 3 credits. Prerequisite: Geol 487 or equivalent. Offered alternate years. Not offered 1967–88.
L. D. Brown.
Techniques for inferring geologic structure and lithology from multichannel seismic reflection data. Data
441 Geomorphology Fall. 3 credits. Prerequisites: Geol 102 or 201, or permission of instructor. 2 lecs, 1 lab. A. L. Bloom. Systematic analysis of landforms constructed by tectonic and volcanic processes and their subsequent progressive destruction by climate-controlled erosional processes.

442 Glacial and Quaternary Geology Spring. 3 credits. Prerequisite: Geol 345 or permission of instructor. Offered alternate years. 2 lecs, 1 lab; several Saturday field trips. A. L. Bloom. Glaciations and deposits and the chronology of the Quaternary Period.

445 Geohydrology (also Ag En 471 and CEE 431) Fall. 3 credits. Prerequisites: Mathematics 294 and Engr 202. 3 lecs, field trips. A. L. Bloom, W. H. Brutsaert, L. M. Cathles, J.-Y. Parlane, T. S. Steenhuis. An introduction to surface- and groundwater flow and related design factors. Includes principles of fluid flow, the hydrologic cycle, natural channel dynamics and sediment transport, description and behavior of natural aquifers, groundwater hydraulics, soil water, and solute transport.

452 X-ray Diffraction Techniques Spring. 3 credits. 1 lec, 2 labs. W. A. Bassett and staff. Automated x-ray diffractometer, Debye-Scherrer, science, and real-time Laue methods. Applications in materials science and geological sciences. Labs will be held in the new Materials Science X-Ray Facility.

453 Modern Petrology Fall. 3 credits. Prerequisite: Geol 356. Offered alternate years. 2 lecs, 2 labs. W. A. Bassett and R. W. Kay. Magmas and metamorphism in the context of plate tectonics. Major and trace element chemistry and major and trace element chemistry and their influence on reaction rates and textures of metamorphic rocks. Application of experimental studies to natural systems. Reading from the literature and petrographic examination of pertinent examples.

454 Advanced Mineralogy Spring. 3 credits. Prerequisites: Geol 355 or equivalent. 2 lecs, 1 lab. W. A. Bassett. Crystallography and crystal chemistry of minerals and the methods of their study. X-ray diffraction, optical methods, computer simulation of crystal structures. Emphasis on effects of high pressures and temperatures with implications for understanding of Earth's interior.


456 Geochemistry Spring. 3 credits. Prerequisites: Chemistry 207, Geol 101 or 201 or equivalent, and Mathematics 112 or 192. Recommended: Geol 355 and 356. 3 lecs. W. M. White. Thermodynamics applied to geology. Principles of trace-element and isotope geochemistry and their application to the study of igneous and metamorphic rocks. Overview of nucleosynthesis, cosmochemistry, and formation and chemical evolution of the earth. Introduction to the chemistry of the oceans and marine sediments.

474 Modern Depositional Systems Spring. 3 credits. Prerequisite: Geol 375 or permission of instructor. Offered alternate years. Not offered 1987-88. 3 lecs. T. E. Jordan. Compositions, textures, sedimentary structures, and facies variations of sediments in modern depositional environments. Clastic and carbonate environments; fluvial, alluvial-fan, delta, intertidal, submarine-fan, carbonate-bank, and atoll systems. Required field trip during spring recess to region of modern examples and/or rock sequences demonstrating ancient examples.

476 Sedimentary Basins: Tectonics and Mechanics Spring. 3 credits. Prerequisite: Geol 375 or permission of instructor. Offered alternate years. 3 lecs. T. E. Jordan. Subsidence of sedimentary basins from the point of view of plate tectonics and geomechanics. Interactions of subsidence, sediment supply, and environmental characteristics in development of stratigraphic sequences. Framework of deep oceans, active-margin, passive-margin, and cratonic basins; and stratigraphy. Topics include sedimentary petrology, geophysical modeling, and the role of sea-level fluctuations. Modern and ancient examples.

479 Paleobiology (also Bio Sci 479) Fall. 3 credits. Prerequisites: Biological Sciences 101-102 and 103-104 or equivalent, and either Geol 375, Biological Sciences 274, or permission of instructor. Offered alternate years. Not offered 1987-88. 3 lecs. J. L. Crine and staff. Survey of the major groups of organisms and their evolutionary histories. Intended to fill out the biological backgrounds of geology students and the geological backgrounds of biology students concerning the nature and significance of the fossil record for their respective studies.

487 Geophysical Prospecting Fall. 3 credits. Prerequisites: Physics 213 and Mathematics 192 or equivalent, or permission of instructor. 2 lecs. S. Kaufman. Physical principles, instrumentation, operational procedures, and interpretation techniques in geophysical exploration for oil, gas, and minerals. Seismic reflection, seismic refraction, gravity, and magnetic and electrical methods of exploration.

489 Earthquakes and Tectonics Fall. 3 credits. Prerequisites: Geol 101 or 201, Mathematics 192, Physics 213, or permission of instructor. Offered alternate years. 3 lecs. B. L. Isacks. The mechanisms of earthquakes revealed by seismic-wave radiation and by near-source studies of faulting and surface deformation; relationships to regional tectonics; earthquake hazard and prediction.

490 Honors Thesis (B.A. degree candidates) Fall, spring. 2 credits. Staff. Thesis proposal to be discussed with director of undergraduate studies during the junior year. Participation requires acceptance of a thesis proposal by the faculty committee.

491-492 Undergraduate Research Fall, spring. 1 credit. Staff. (D. E. Karig and A. L. Bloom, coordinators). An introduction to the techniques and philosophy of research in the earth sciences and an opportunity for undergraduates to participate in current staff research projects. Topics chosen in consultation with, and guided by, a staff member. A short written report is required, and outstanding projects are prepared for publication.

600-699 Seminars and Special Work Fall, spring. 1-3 credits. Prerequisite: permission of instructor. Advanced work on original investigations in geological sciences. Topics change from term to term.

621 Tectonic and Stratigraphic Evolution of Sedimentary Basins W. B. Travers.

622 Advanced Topics in Structural Geology R. W. Allmendinger.


625 Rock and Sediment Deformation D. E. Karig.

631 Plate Tectonics and Geology J. M. Bird.

641 Advanced Geomorphology Topics A. L. Bloom.

651 Petrology and Geochemistry R. W. Kay.


655 Advanced Topics in Petrology and Tectonics J. M. Bird, W. A. Bassett.

657 Current Research in Petrology R. W. Kay.

662 Advanced Topics in Petroleum Exploration W. B. Travers.

671 Advanced Topics in Sedimentology and Stratigraphy T. E. Jordan.

673 Paleobiology J. L. Crine.

680 Seismic Record Reading M. Barazangi, B. L. Isacks.


683 Earthquakes and Tectonics B. L. Isacks.

685 Exploration Seismology, Gravity, Magnetics S. Kaufman.

687 Geophysics, Seismology, and Geotectonics J. E. Oliver.


691 Philippine Geology and Tectonics D. E. Karig.


This course is intended to familiarize students with the growing importance of computers in geological and geophysical research. Students will be required to develop, debug, implement, and document a program relevant to current research in the Department of Geological Sciences. Available facilities include the department's VAX 11/750 and MEGASEIS seismic computers, DI-3000 graphics software, IIS image processor, and numerous graphics and I/O peripherals.
Materials Science and Engineering

Undergraduate Courses

122 Composite Materials: Design and Applications (also Engr 122) Fall. 3 credits. 2 lecs, 1 lab or rec.
For description see Engineering Common Courses.

201 Elements of Materials Science and Engineering (also Engr 111) Fall, spring. 3 credits. Autotutorial.
For description see Engineering Common Courses.

262 Introduction to Electrical Properties of Materials (also Engr 262) Spring. 3 credits. 2 lecs, 1 rec or lab.
For description see Engineering Common Courses.

332 Electrical and Magnetic Properties of Materials Spring. 3 credits.

333 Research Involvement I Fall. 3 credits. Prerequisite: approval of department. Semi-independent research project in association with faculty member and faculty research group of the department. Students design equipment and experiments and evaluate results. Creativity and control of materials processing and microstructure.

334 Research Involvement II Spring. 3 credits. Prerequisite: approval of department. May be a continuation of MSEE 333 or a one-term affiliation with a research group.

335 Thermodynamics of Condensed Systems Fall. 3 credits. 3 lecs.
The three laws of thermodynamics are introduced as a basis for understanding phase equilibria, heterogeneous reactions, solutions, electrochemical processes, surfaces, and defects. Examples of design and control of materials processing and microstructure are discussed.

336 Kinetics, Diffusion, and Phase Transformations Spring. 3 credits. 3 lecs.
Introduction of absolute rate theory, atomic motion, and diffusion. Applications to nucleation and growth of new phases in vapors, liquids, and solids; solidification; crystal growth, oxidation and corrosion, radiation damage, recrystallization, gas-metal reactions, and thermomechanical processing to produce desired microstructures and properties.

345 Materials and Manufacturing Processes (also M&E 312) Spring. 3 credits. Prerequisite: T&M 202 or permission of instructor. 2 lecs, 1 lab.
For description see M&E 312.

441 Macroprocessing of Materials Fall. 3 credits. 3 lecs, occasional lab. Introduction to engineering and design of large-scale integrated circuits. All the major processing steps involved in fabricating a VLSI (very-large-scale integration) circuit. Metalurgical processes for winning high-purity silicon from SO₂*-2, single-crystal growth, zone-melting and zone refining, Burton-Prim-Shlicker theory of the effective distribution coefficient, epitaxial growth of silicon. Thermal oxidation of silicon to form SiO₂*, mathematical theory of solid-state diffusion with specific application to the doping of silicon to form integrated circuit devices (e.g., resistors, diodes, and bipolar transistors). Evaluation of diffused layers by electrical measurements. Unhard- Scharff-Schott theory of ion implantation; stopping power, electronic and nuclear energy-loss mechanisms, range and damage profile. Application of ion implantation to the fabrication of the MOSFET (metal-oxide semiconductor field-effect transistor). Etching, metallization, photolithography, metal-semiconductor contacts, failure due to electromigration effects.

442 Macroprocessing (also M&E 512) Spring. 3 credits. 3 lecs. Deformation processing of materials, including superplastic forming, sheet-metal forming, massive forming, and powder processing. Time, temperature, and strain-rate effects in warm forming and hot forming. Characterization of powder-compaction mechanisms and their use in process design. Forming-limit diagrams. Development of microstructure-based criteria for fracture in large deformations. Optimization and design of forming processes. Development of constitutive equations for superplastic flow. Design of a superplastic forming process starting from basic design. The forming experiment is carried out, and the results are compared with the predictions from the numerical analysis.

443-444 Senior Materials Laboratory 443, 444. Spring. 3 credits. Projects are available in plasticity of metals and ceramics, mechanical and chemical processing, phase transformations, electrical and ionic conductivity, analysis of defects by electron microscopy, sintering, crystal growth, etc. Emphasis is placed on group design of experimental equipment for analysis and evaluation of a material's properties and performance in terms of its processing history and microstructure.

445 Mechanical Properties of Materials Fall. 3 credits. 3 lecs. Relation between stress, strain, concept of equivalent stresses and strains; failure criteria for metals, polymers, and ceramics. Applications of fracture mechanics to fatigue design. Analysis of important mechanical properties such as plastic flow, creep, fatigue, fracture toughness, and rupture and their variation with temperature in terms of the interaction of the microstructure with lattice defects. Application of these principles to the design of improved materials.

447 Materials Design Concepts I Fall. 1 credit. Speakers from industry and other institutions will give case studies of design problems. Students will write a proposal for a design-study project, which will be approved by the instructor. At the level of Engineering Design, by Deller.
Graduate-Level Professional Courses

510 Optical Methods and Materials  Fall. 3 credits. Principles of geometric and Gaussian optics, instrumentation required for optical experiments, and methods in optical spectroscopy. Fundamental aspects of the interaction between optical waves and crystalline solids. Materials aspects of optical devices such as optical films and coatings, light-modulation devices, displays, lasers and detectors, optical waveguides, electro-optic devices, optical recording, and applications of high-intensity light beams.


553--554 Special Project  553, fall; 554, spring. 6 credits each term. Research on a specific problem in the material area.

Graduate Core Courses


602 Elasticity and Physical Properties of Crystals  Fall. 3 credits. Cartesian tensors, elastic stress and strain, constitutive relations between stress and strain, symmetry of crystals, generalized tensor representation of elasticity and other reversible and irreversible properties of crystals; mathematical theory of infinitesimal elasticity with applications, including wave propagation and stress fields of dislocations; mathematical theory of yield stress and plasticity; origin of elastic behavior. At the level of Physical Properties of Crystals, by Nye.

603 Structural Defects in Solids  Spring. 3 credits. Prerequisites: MS&E 601 and 602, or equivalent. Bonding energies in perfect crystals. Structure and energetics of point, line, and planar defects in crystalline materials, including metals, ionic solids, covalent solids, and polymers. Interactions between defects. Bonding and random packing in amorphous materials. Observation of defects in crystalline materials. Structural analysis of amorphous materials.


605 Plastic Flow and Fracture of Materials  Fall. 3 credits. Experimental and theoretical aspects of the deformation and failure of structural materials. Although the emphasis is on metals and alloys, consideration is given also to glasses, ceramics, and polymer materials. Some of the topics included are theory and practice of mechanical testing, deformation behavior of polycrystal and single-crystal metals, phenomenological theories of deformation, micromechanical theories of plastic flow and creep, relationship of microstructure to mechanical properties, brittle and ductile fracture of materials.

Related Course in Another Department

Introductory Solid-State Physics (Physics 454)

Further Graduate Courses

610 Principles of Diffraction (also A&EP 711)  Fall. 3 credits. Offered alternate years. For description see A&EP 711.

612 Phase Transformations 3 credits. Prerequisite: MS&E 601 and 604 or equivalent preparation.

613 Crystal and structural transitions in condensed systems, including spinoidal decomposition, cellular transformations, and diffusionless transformations; clustering and ordering in solid solutions, radiation-induced precipitation; condensation and evaporation phenomena; order-disorder transformations; transitions in magnetic, ferroelectric, and superconducting materials; phase equilibria and transitions in surface and grain-boundary layers. Phase transitions in metallic, ceramic, semiconducting, and polymeric systems. Thermodynamic, statistical thermodynamic, structural, and kinetic aspects of the transitions. Modern methods of observation. At the level of The Theory of Transformations in Metals and Alloys, by Christian; Critical Phenomena in Alloys, Magnets and Superconductors, edited by Mills, Ascher, and Jaffee; and current review articles.

614 Electron Microscopy  Spring. 3 credits. Laboratory section limited to 12 students; if more than 12 students register, sections will be assigned after consultation with students' advisors.

Electron optics, Abbé theory of image formation with applications to the direct imaging of small defects and atomic planes. Kinematical theory of diffraction with applications to the study of the structure of grain boundaries and the imaging of crystal defects. Dynamical theory of diffraction as applied to the calculation of the images of crystal defects.

616 Electrical and Magnetic Properties of Materials  3 credits. Prerequisite: Physics 454 or equivalent.

Electronic transport properties of metals and semiconductors, semiconductor devices, optical and dielectric properties of insulators and semiconductors, laser materials, dielectric breakdown, structural aspects of superconducting materials, ferromagnetism and magnetic materials. At the level of Physics of Semiconductor Devices, by Sze; Ferromagnetism, by Bozworth; and current review articles.

618 Laser Processing of Materials 3 credits. Use of high-intensity lasers in the processing of materials to achieve unique microstructures and metastable phases. Topics: fundamentals of the interaction of E&M fields with metals, semiconductors and ceramics, transfer of energy between electronic and phonon systems, kinetics of rapid solidification, metastable phase transformations, microstructure of rapidly solidified materials, and current industrial applications.

620 Synthesis of Polymeric Materials 3 credits. Prerequisite: MS&E 452 or permission of instructor. Offered alternate years.

Preparation of synthetic polymers by step- and chain-growth polymerization: condensation; free radical, anionic, and cationic mechanisms; ring opening and coordination routes. Statistical and kinetic aspects of homopolymer and copolymer formation. Stereochemistry of polymers and spectroscopic methods for polymer analysis. Molecular aspects of polymer design for properties such as conductivity, elasticity, thermal stability, and engineering properties. Topics will also include liquid crystalline polymers, polymers for photoresists, and adhesive-binder polymers. At the level of Principles of Polymerization, by Odian, and current literature.
Speciality Courses

707 Solar Energy Materials 3 credits.
Photovoltaic energy conversion: (1) theory (on the level of Hovel); (2) the role of crystal defects and grain boundaries on the conversion efficiency, and schemes to passivate these defects; (3) current investigations in the DOE program to produce large quantities of solar-grade semiconducting Si; (4) theory and materials for amorphous silicon solar cells.

779 Special Studies in Materials Sciences Fall, spring. Variable credit.
Supervised studies of special topics in materials science.

798 Materials Science and Engineering Colloquium Fall, spring. 1 credit each term. Credit limited to graduate students. Lectures by visiting scientists, Cornell staff members, and graduate students on subjects of interest in materials sciences, especially in connection with new research.

799 Materials Science Research Seminars Fall, spring. 2 credits each term. For graduate students involved in research projects. Short presentations on research in progress by students and staff.

800 Research in Materials Science Fall, spring. Credit to be arranged. Prerequisite: candidacy for Ph.D. in materials science.
Independent research in materials science under the guidance of a member of the staff.

801 Research in Materials Science Fall, spring. Credit to be arranged. Prerequisite: candidacy for M.S. in materials science.
Independent research in materials science under the guidance of a member of the staff.

Mechanical and Aerospace Engineering

General and Required Courses

101 Naval Ship Systems (also Naval Science 102) Spring. 3 credits. Limited to freshmen and sophomores. A free elective for engineering students. R. L. Wehe.
An introduction to primary ship systems and their interrelation. Basic principles of ship construction. Stability, propulsion, control, internal communications, and other marine systems.

102 Drawing and Engineering Design (also Engr 102) Fall, spring. 1 credit. Half-term course offered twice each semester. Enrollment limited. Recommended for students without previous mechanical drawing experience. S-U grades optional. 2 lecs, 1 lab.
For description see Engineering Common Courses.

117 Introduction to Mechanical Engineering (also Engr 117) Fall. 3 credits. 2 lecs, 1 lab.
For description see Engineering Common Courses.

119 Introduction to Manufacturing Engineering (also Engr 119) Spring. 3 credits. 2 lecs, 1 lab.
For description see Engineering Common Courses.

221 Thermodynamics (also Engr 221) Fall, spring. 3 credits. Prerequisites: Mathematics 101 and 192 and Physics 112.
For description see Engineering Common Courses.

An introduction to the history of technology from the origins of modern technological society to the present. Emphasis is on the social and human consequences of technology rather than on internal or historical history. Of primary interest are the nineteenth and twentieth centuries and the pervasive effects of industrialization — a process that began with manufacturing and was rapidly extended to agriculture, culminating in what Ivan Illich has called the industrialization of man. Among the current topics included are the transition from an economy of abundance and affluence to one of impending shortages and limits to growth, alternative lifestyles, alternative energy sources and systems, and the growing interest in intermediate or appropriate technology.

312 Fundamentals of Manufacturing Processes (also MS&E 345) Spring; may be offered in Engineering Cooperative Program. 3 credits. Prerequisites: Engr 202 and 261, or permission of instructor.
2 lecs, 1 lab; evening exams may be given. Yield criteria and plastic flow. Manufacturing processes for engineering materials, including metals, polymers, ceramics, and composites. Casting, forming, material removal, and joining processes.

323 Introductory Fluid Mechanics Fall; usually offered in Engineering Cooperative Program. 4 credits. Prerequisites: Engr 202 and 203 and coregistration in 221, or permission of instructor.
4 lecs, evening prelims.
Statics, kinematics, potential flow, dynamics, momentum and energy relations. Thermodynamics of compressible and incompressible flow, dimensional analysis, real fluid phenomena, laminar and turbulent motion, boundary layer, lift and drag, supersonic flow and shock waves.

324 Heat Transfer Spring; may be offered in Engineering Cooperative Program. 3 credits. Prerequisite: M&E 323.
3 lecs, evening prelims.

325 Mechanical Design and Analysis Fall; usually offered in Engineering Cooperative Program. 4 credits. Prerequisites: Engr 202 and 203.
3 lecs, 1 lab.
Application of the principles of mechanics and materials to problems of analysis and design of mechanical components and systems.

326 Systems Dynamics Spring; may be offered in Engineering Cooperative Program. 4 credits. Prerequisites: M&AE 325.
3 lecs, 1 lab, evening prelims.
Dynamic behavior of mechanical systems: modeling, analysis techniques, and applications: vibrations of single and multi-degree-of-freedom systems; linear control systems, PDF control, stability analysis. Computer simulation (CADD) and experimental studies of vibration and control systems.

427 Mechanical Engineering Laboratory Fall. 4 credits. Prerequisites: M&AE 324 and 326.
1 lec, 2 labs.
Laboratory exercises in instrumentation, techniques, and methods used in mechanical engineering: Measurements of pressure, temperature, heat flow, drag, fluid-flow rate, shock-wave phenomena, displacement, vibrations, and engine performance.

428 Engineering Design Fall. 1 credit.
Prerequisite: completion of six semesters in mechanical engineering or equivalent.
1 lec.
General principles of design, relevant to both the fluids, energy, and heat transfer stem and the mechanical systems and manufacturing stem of mechanical engineering.

Mechanical Systems and Design and Manufacturing

464 Design for Manufacture Spring. 3 credits.
Prerequisites: M&AE 312 and 325, or permission of instructor.
Philosophy and methodologies for conceptual design; elimination procedures for selecting design alternatives; emphasis on design for manufacturability, quality, and cost considerations; team design projects from concept, analysis, and computer-aided drafting to manufacturing methods.

465 Biomechanical Systems—Analysis and Design Spring. 3 credits. Prerequisites: Engr 202 and 203.
2 lecs, 1 lab. D. L. Bartel.
Selected topics from the study of the human body as a mechanical system. Emphasis on the modeling, analysis, and design of biomechanical systems frequently encountered in orthopaedic engineering and rehabilitation engineering.

486 Automotive Engineering Spring. 3 credits. Prerequisite: M&E 325.
Selected topics in the analysis and design of vehicle components and vehicle systems. Emphasis is on automobiles, trucks, and related vehicles. Power plant, driveline, brakes, suspension, and structure. Other vehicle types may be considered.

489 Computer-aided Design Spring. 3 credits. Limited to juniors and seniors. A first course in CAD, assuming completion of a course in programming. May be taken either before or in conjunction with a numerical methods course. Fulfills computer applications requirement.
2 lecs, 1 sec of computational assignments at CADIF. D. L. Taylor.
The use of software and computer methods in the solution of mechanical engineering problems. Use of commercial software (drafting, solid modeling, finite-element analysis, simulation, etc.) as appropriate. Topics include simulation (ordinary differential equations), optimization, solution of field equations (finite element, finite difference), least squares, geometry (space curves, splines, patches), and computer graphics.

512 Analysis of Materials Processing (also MS&E 442) Spring. 3 credits. Prerequisite: M&AE 312. 3 lecs. P. Dawson, R. Raj.
Review of basic principles of plasticity and inelastic behavior of crystalline solids. Application of slab models, bound theorems, and slipline theory to problems of forging, extrusion, and rolling. Analysis of sheet-metal forming, including forming limits and springback. Discussion of defect initiation during the forming process.

514 Numerical Control in Manufacturing Fall. 3 credits. Prerequisite: upperclass standing in engineering.
Principles and the state of the art of numerical control (NC) technology; design considerations for control systems and programming methods for NC and computerized NC (CNC) machines. Emphasis on geometric modeling of surfaces and solid objects; NC code generation and verification; computer-aided manufacturing (CAM) systems.
517 Introduction to Robotics (also CS 561) Fall. 3-4 credits. Enrollment limited; intended for graduate students but open to seniors. Prerequisite: computer programming and calculus. 1 lec, 2 labs.

569 Mechanical and Aerospace Structures I Fall. 3 credits. Prerequisite: M&E 325 or permission of instructor. J. F. Booker.
A study of advanced topics in the analysis of stress and deformation of elastic bodies, with applications to the analysis and design of mechanical and aerospace systems.

575 Microprocessor Applications Fall. 3 credits. Enrollment limited; intended for graduate students with limited background in digital circuitry; open to undergraduates with permission of instructor. Prerequisite: background in basic laboratory electronics. Fulfills computer applications requirement. 2 lecs, 1 lab.
Introduction to digital circuitry, microprocessors, and microprocessor-based data acquisition and control systems. Basic concepts of data representation, microprocessor and microcomputer instruction set, parallel and serial input/output, analog-to-digital conversion, and hardware and software requirements for interfacing. Emphasis on applications of the 6502 microprocessor and assembly language programming. Independent laboratory work on several applications projects, including the process control and data-acquisition procedures.

577 Mechanical Vibrations Fall. 3 credits. Open to qualified undergraduates. Prerequisite: M&E 326 or equivalent. 2 lecs, 1 lab.
Further development of vibration phenomena in single- and multi-degree-of-freedom linear and nonlinear systems, with emphasis on engineering problems involving analysis and design.

578 Feedback Control Systems Fall. 3 credits. Open to qualified undergraduates. Prerequisite: M&E 326 or permission of instructor. 2 lecs, 1 lab. R. M. Phelan.
Further development of the theory and implementation of feedback control systems, with particular emphasis on the application of pseudo-derivative-feedback (PDF) control concepts to the design and operation of linear and nonlinear systems.

583 Mechanical Reliability and Fracture Fall. 3 credits. Prerequisites: Engr 260 or 270 or equivalent. Not offered 1987–88.
Basic concepts of fracture mechanics; stress concentration factors, Griffith energy criterion, stress fields around crack tips, stress intensity factors, mode I to III cracks, fracture toughness, models of the crack-tip plastic zone, fatigue crack-propagation laws, Weibull distribution as a model for strength, statistical theory of fiber bundle strength, models for composite strength and fatigue, kinetic basis of fatigue laws (including temperature effects), selected design problems.

589 Computer-aided Research, Design, and Development Fall. 3 credits. Prerequisite: M&E 489 or equivalent. 2 lecs, computational assignments at CADIF. D. L. Taylor.
Introduction to a wide range of topics and programming techniques that are useful in the development of engineering models for computer analysis. Emphasis on data structure and integration of existing packages. Extensive use of computer graphics. Intended to prepare students to take an active role in the development of CAD software. Topics include computer graphics, data structures, 3-D modeling, role of new languages (LISP, FORTRAN, C), and program development and debugging.

610 Geometric Modeling Fall. 4 credits. Prerequisite: grading standing and two years of engineering mathematics (through linear algebra and Pascal) or similar programming experience. H. Voelcker.
Development of mathematical and computational models for rectilinear solids (flat-faced polyhedra) from basic principles of geometry, topology, and representation theory; generic algorithms; algorithms for generating graphic displays and calculating mass properties; design in design and manufacturing; modeling systems.

612 Motion-Process Modeling: Manipulation and Machining Spring. On demand. 4 credits. Prerequisite: M&E 610 and B.S.-level knowledge of mechanical dynamics and control theory. H. Voelcker.
Classification of machining and manipulatory processes and host machines, spatial and dynamical modeling of mechatronic machines and processes; low-motional motion planning; control of motion; CNC machines and industrial robots; programming hierarchies.

615 Composite Materials (also T&M 555 and M&AE 615) Spring. 4 credits. Prerequisites: Engr 202 and 261, graduate standing, or permission of instructor. Brief history of composite materials; types, geometries, fiber types, and structures; polymer matrices and deformation properties; orthotropic elasticity; stress-strain analysis of lamina and laminates; micromechanics of deformation and stress transfer, effective moduli, theories of strength and fatigue, nondestructive testing and inspection, applications of composites, environmental effects.

Application of modern mechanics theory and advanced numerical techniques for the analysis of materials processing, including the use of elastic-plastic and visco-plastic constitutive models for analyzing deformation during large-strain forming operations. Emphasis is on the basic capabilities of modern formulations and on their numerical implementation. Interactions among thermal, mechanical, and material-structure behaviors are presented. Applications are to metal forming and polymer processing.

665 Advanced Topics in Orthopaedic Biomechanics Spring. 4 credits. Prerequisite: grading standing, prior or concurrent registration in advanced courses in strength of materials or elasticity, and intermediate dynamics. Offered alternate years.
3 lecs. D. L. Bartel.
Advanced treatment of topics in the biomechanics of the musculoskeletal system. Force analysis of the musculoskeletal system under static and dynamic conditions, compact and trabecular bone as structural materials, bone remodeling of bone-implant systems, modeling of bone.

670 Mechanical and Aerospace Structures II Spring. 4 credits. Prerequisite: M&E 569 or permission of instructor. Fulfills computer applications requirement. J. F. Booker.
Introduction to modern computational techniques, particularly finite-element analysis and related matrix methods, for static and dynamic analysis of mechanical and aerospace structures (and related nonstructural applications such as automotive heat transfer). Primary emphasis on underlying mechanics and mathematics. Secondary consideration of inherent capabilities and limitations of large-scale general-purpose structural mechanics programs such as NASTRAN, ANSYS, and SAP4. Introduction to computational aspects through development of small program segments and application of existing larger programs, using micro-, mini-, and mainframe computers. Term project.

672 Experimental Methods in Machine Design Fall. On demand. 4 credits. Prerequisite: M&E 325 or equivalent. 1 rec, 2 labs.
Investigation and evaluation of methods used to obtain design and performance data. Photoelasticity, strain measurement, photography, vibration and sound measurements, transducers.

676 Advanced Mechanical Vibrations On demand. 4 credits. Prerequisite: M&E 577 or equivalent, graduate standing, or permission of instructor.
2 lecs, 1 lab, computer assignments at CADIF. D. L. Taylor.
Response of multi-degree-of-freedom systems, including damping, with emphasis on computer techniques. Matrix formulation, solution of the eigenproblem, calculation and interpretation of frequency response and complex mode shapes. Nonconservative systems, self-excited oscillations, nonlinear vibrations, and limit-cycle analysis. Introduction to random vibrations and vibrations of elastic bodies. Computational activities include use of CAD packages and CADIF. Lab includes system identification by impulse testing, single-point sine sweep, and single-point random excitation.

679 Digital Simulation of Dynamic Systems Fall. On demand. 4 credits. Open to qualified undergraduates with permission of instructor. Prerequisite: previous exposure to systems dynamics and digital programming.
J. F. Booker.
Modeling and representation of physical systems by systems of linear and nonlinear ordinary differential equations and state vector form. Selected applications from diverse fields. Simulation diagrams. Simulation by numerical integration. Components and organization of general-purpose digital-simulation languages (e.g., DLS, CSMIP). Modal analysis of stability and response of large linear systems. Term project.

680 Random Vibration (also CEE 671) Fall. On demand. 4 credits. Prerequisites: Engr 260 or M&E 326 or equivalent, graduate standing, or permission of instructor.
Probabilistic descriptors of linear and nonlinear systems; stochastic inputs with Gaussian and other distributions, means, covariance and autocorrelation functions, power spectral densities, first-passage time distributions, applications to fatigue studies, structural response to wind and wave forces, seismic analysis, chaotic vibration of nonlinear systems. Interactive computer programs with graphics in the CADIF facility are used.

Theory of hydrodynamic lubrication and its application to the analysis and design of fluid-fluid bearings. General topics include viscous flow in thin films, self-acting and externally pressurized bearings with liquid
and gas lubricant films, bearing-system dynamics, and computational methods. Also selected special topics such as elastohydrodynamic lubrication.

684 Advanced Mechanical Reliability Fall, on demand. 4 credits. Prerequisite: M&AE 483 or permission of instructor. S. L. Phoenix.

Advanced course in random loading and statistical failure processes in mechanical systems. Continuous and discrete random loadings; random vibrations of mechanical structures; random fatigue processes in materials; order statistics and statistical estimation of reliability simulation, and computation in mechanical structures; coherent systems and monotone load sharing, stochastic failure of bundles and composites.

[685 Optimum Design of Mechanical Systems Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Offered alternate years. Not offered 1987--88. 3 recs. D. L. Bartel.

The formulation of design problems frequently encountered in mechanical systems as optimization problems. Theory and application of methods of mathematical programming for the solution of optimum design problems.]

Energy, Fluids, and Aerospace Engineering

405 Introduction to Aeronautics Fall. 3 credits. Limited to upperclass engineers; others with permission of instructor. D. A. Caughey.


[441 Advanced Thermodynamics with Energy Applications Spring. 3 credits. Prerequisite: M&AE 221 and M&AE 323 or permission of instructor. Not offered 1987--88.

Review of thermodynamics. Applications to phase changes, heat engines, and combustion. Magneto-hydrodynamic and ferrostatic power generation. Statistical basis of thermodynamics laws and applications to lasers and semiconductors.]

449 Combustion Engines Spring, on demand. 3 credits. Prerequisite: Engr 221 and M&AE 323. 3 lecs.

Introduction to combustion engines, with emphasis on application of thermodynamics and fluid dynamics. Air-standard analyses, chemical equilibrium, ideal-cycle analyses, deviations from ideal processes. Combustion knock. Formation and control of undesirable exhaust emissions.

506 Aerospace Propulsion Systems Spring, on demand. 3 credits. Prerequisite: M&AE 323 or permission of instructor. Offered alternate years. 3 lecs.

Application of thermodynamics and fluid mechanics to design and performance of thermal-jet and rocket engines. Mission analysis in space. Auxiliary power supply.

[507 Dynamics of Flight Vehicles Spring. 3 credits. Prerequisite: M&AE 405 and Engr 203, or permission of instructor. Offered alternate years. Not offered 1987--88.


530 Fluid Dynamics Fall. 3 credits. Prerequisite: M&AE 323 and senior or graduate standing or permission of instructor. F. K. Moore.

Inviscid fluid dynamics and aerodynamics, including incompressible and supersonic flows, flow over bodies, lift, and drag. Shock waves. Courses 530 and 531 are of interest primarily to seniors and M Eng students; however, incoming M.S. or Ph.D. students who will not major in fluid mechanics but need competence in problem solving and basic problem formulation should be included also. The courses may be taken independently or as a sequence.

531 Boundary Layers Spring. 3 credits. Prerequisite: M&AE 323 and senior or graduate standing, or permission of instructor. Recommended: M&AE 530 or equivalent. Nalver-Stokes equations. Boundary layers, laminar and turbulent. Skin friction, separation and transition. Jets and wakes.

536 Turbomachinery and Applications Spring. 3 credits. Prerequisite: M&AE 323 or equivalent. 3 lecs. F. K. Moore.

Aerothermodynamic design of turbomachines in general, energy transfer between fluid and rotor in specific types, axial and radial devices, compressible flow. Three-dimensional effects, surging.

543 Combustion Processes Spring. 3 credits. Prerequisites: M&AE 323 and 324. 3 lecs. An introduction to combustion and flame processes, with emphasis on fundamental fluid dynamics, heat and mass transport, and reaction-kinetic processes that govern combustion rates. Thermochemistry, kinetics, vessel explosions, laminar and turbulent premixed and diffusion flames, droplet combustion, combustion of solids.

554 Solar Energy Spring. 3 credits. Prerequisite: Engr 221 or equivalent. Fundamentals of solar radiation. Direct solar radiation as a source of electrical energy. The direct uses of solar radiation; water, wind, and biomass. Applications to architecture and environment control by both active and passive means. Industrial uses of solar energy and the production of liquid and gaseous fuels. Economics and systems analysis.

558 Power Systems Fall. 3 credits. Prerequisite: M&AE 323 or equivalent. P. L. Auer.

A broad survey of methods of large-scale power generation, emphasizing energy sources, thermodynamic cycle considerations, and component description. Power-industry, economic, and environmental factors. Trends and projections.

559 Introduction to Controlled Fusion: Principles and Technology (also EE 484 and NS&E 484) Spring. 3 credits. Prerequisites: Physics 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics with permission of instructor. Intended for seniors and graduate students. 3 lecs. D. A. Hammer or P. L. Auer.

This course is intended to give engineering and physical science students an introduction to the physical basis and technological requirements for generating useful power by nuclear fusion. For complete description see NS&E 484.

601 Foundations of Fluid Dynamics and Aerodynamics Fall. 4 credits. Prerequisite: graduate standing or permission of instructor.

S. B. Pope.

Foundations of fluid mechanics from an advanced viewpoint. Aspects of kinetic theory as it applies to the formulation of continuum fluid dynamics. Surface phenomena and boundary conditions at interfaces. Fundamental kinematic descriptions of fluid flow, tensor analysis, derivation of the Navier-Stokes equations and energy equation for compressible fluids. Viscous flows, boundary layers, potential flows, vorticity dynamics.

602 Incompressible Aerodynamics Spring. 4 credits. Prerequisite: M&AE 501 or equivalent. Open to qualified undergraduates with permission of instructor. J. L. Lumley.


603 Compressible Aerodynamics Spring. 4 credits. Prerequisite: M&AE 501 or equivalent or permission of instructor. S. F. Shen.


608 Physics of Fluids Fall. 4 credits. Prerequisite: Graduate standing or permission of instructor. F. C. Gouldin.

Kinetic theory of gases: transport properties; derivation of the macroscopic equations of mass, momentum, and energy, flow of rarefied gases. Statistical mechanics of gases: method of the most probable value, Darwin-Fowler method of mean values, law of mass action. Introduction to wave mechanics: harmonic oscillator, rigid rotator, one-electron atom. Atomic and molecular structure; building-up principle, Born-Oppenheimer approximation. Chemical reaction rate theory.

[530 Atmospheric Turbulence and Micrometeorology Spring. 4 credits. Open to qualified undergraduates with permission of instructor. Offered alternate years. Not offered 1987--88.

Z. Warhaft.

Basic problems associated with our understanding of the structure of the velocity field and the transport of scalars such as temperature and moisture in the lower atmosphere from both theoretical and experimental viewpoints. Topics include the second-order turbulence equations and their closure, Monin-Obukhov theory, diffusion of scalars, and characteristics of atmospheric variables; experimental techniques, including remote sensing; and the analysis of random-time series.]

[548 Seminar on Combustion Fall. 2 or 4 credits. Prerequisite: permission of instructor. Offered alternate years. Not offered 1987--88.

S. B. Pope, T. A. Carlson.

Discussion of contemporary problems in combustion research, with emphasis on applications of modern experimental and analytical techniques. Typical problems have included formation and removal of pollutants, basic burning rates, combustion of alternative fuels, coal combustion, combustion in turbulent flow, and droplet combustion.]

651 Advanced Heat Transfer Spring. 4 credits. Prerequisite: graduate standing or permission of instructor. Advanced treatment of conductive and convective heat transfer. Basic equations presented in detail. Integral and differential formulations. Exact and approximate solutions. Forced convection. Natural convection. Laminar and turbulent flows. Effects of viscous dissipation and mass transfer.
653 Experimental Methods in Fluid Mechanics, Heat Transfer, and Combustion  Spring. 4 credits. 2 lecs, 1 lab. Z. Warhaft.

Study of experimental techniques for measuring pressure, temperature, velocity, and composition of gases, with emphasis on experimental capabilities and physical principles. Topics include laser velocimetry, hot-wire anemometry, spectroscopy, and laser scattering.

704 Viscous Flows  Fall, on demand. 4 credits. Prerequisite: M&AE 601 or permission of instructor. S. F. Shen.

A systematic study of laminar-flow phenomena (including compressibility and heat transfer) and methods of analysis. Exact solutions of the Navier-Stokes equations. Linearized problems; flow at small Reynolds numbers, laminar instability. The boundary-layer approximation; general properties. Transformations for compressibility and axisymmetric effects. Approximate methods of calculation. Separation and unsteady problems. Stability of laminar flows.


733 Stability of Fluid Flow  Fall. 4 credits. S-U grades only. Prerequisite: graduate standing or permission of instructor. Offered alternate years. Not offered 1987–88. S. Leibovich.


734 Turbulence and Turbulent Flow  Fall. 4 credits. Prerequisite: M&A 601 or permission of instructor. J. L. Lumley.

Topics include the dynamics of buoyancy and shear-driven turbulence, boundary-free and bounded shear flows, second-order modeling, the statistical description of turbulence, turbulent transport, and spectral dynamics.

736 Computational Aerodynamics  Spring. 4 credits. Prerequisite: graduate standing, an advanced course in continuum mechanics or fluid mechanics, and some FORTRAN programming experience. D. A. Caughey.

Numerical methods for hyperbolic partial differential equations and those arising in inviscid and high-Reynolds-number fluid-flow problems. Finite difference and finite volume methods. Accuracy, convergence, and stability of explicit and implicit methods, including treatment of boundary conditions and grid generation for complex geometries. General procedures for solving the Euler equations, with a critical survey of current methods for problems of aerodynamic interest, including those which are dominatedly hyperbolic (such as unsteady flows with shock waves) or are mixed elliptic-hyperbolic (such as steady transonic flows). Assigned problems are solved using a digital computer.

Special Offerings

001 Introduction to Mechanical Technology  Fall. No credit. Enrollment limited. 1 sec. Offered to students lacking a basic understanding of mechanical devices and technology. Hands-on experience with various typical devices such as engines, refrigeration units, heat pumps, etc.

490 Special Investigations in Mechanical and Aerospace Engineering  Fall, spring. Credit to be arranged. Limited to undergraduate students. Prerequisite: permission of instructor. Intended for individual student or a small group of students who want to pursue a particular analytical or experimental investigation outside of regular courses or for informal instruction supplementing that given in regular courses.

491 Design Projects in Mechanical and Aerospace Engineering  Fall, spring. 3–6 credits, to be arranged. Prerequisite or corequisite: M&A 428. Intended for individual students or small groups of students who want to pursue particular design projects outside of regular courses.

590 Mechanical Engineering Design  Spring. 4 credits. Intended for students in M.Eng.(Mechanical) program.

Formal consideration of the complete design process (including creativity, planning, scheduling, cost analysis, management, and analytical methods) in the context of one or more specific projects carried out by the students. Projects may arise from departmental research interests or industrial collaboration.

592 Seminar and Design Project in Aerospace Engineering  Fall, spring. 2 credits each term. Intended for students in M.Eng.( Aerospace) program. Study and discussion of topics of current research interest in aerospace engineering. Individual design projects supervised by separate faculty members.

594 Manufacturing Engineering Seminar  (also OR&E 504) Fall, spring. 1 credit. S-U grades optional. A weekly meeting for Master of Engineering students. Discussion of various topics on manufacturing with faculty members and outside speakers.

690 Special Investigations in Mechanical and Aerospace Engineering  Fall, spring. Credit to be arranged. Prerequisite: permission of instructor. Lecture or seminar format. Topics of current importance in mechanical and aerospace engineering and research. More than one topic may be taken if offered.

791 Mechanical and Aerospace Research Conference  Fall, spring. 1 credit each term. For graduate students involved in research projects. Presentations on research in progress by faculty and students.

799 Mechanical and Aerospace Engineering Colloquium  Fall, spring. 1 credit each term. Credit limited to graduate students. All students and staff invited to attend. Lectures by visiting scientists and Cornell faculty and students on research topics of current interest in mechanical and aerospace science, especially in connection with new research.

890 Research in Mechanical and Aerospace Engineering  Credit to be arranged. Prerequisite: candidacy for M.S. degree in mechanical or aerospace engineering or approval of director. Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the faculty.

900 Research in Mechanical and Aerospace Engineering  Credit to be arranged. Prerequisite: candidacy for Ph.D. degree in mechanical or aerospace engineering or approval of director. Independent research in an area of mechanical and aerospace engineering under the guidance of a member of the faculty.

Nuclear Science and Engineering 295

A number of courses in nuclear science and engineering are offered through the School of Applied and Engineering Physics, see A&E 609, 612, 613, 633, 634, 636, 638, 651, and 652.
a basic course for those who do not intend to continue in the field. 303 is a reasonably self-contained unit that can be taken by itself by those desiring only one term.

3 lecs. V. O. Kostroun.
Introduction to the fundamentals of nuclear reactors. Topics include an overview of the field of nuclear engineering; nuclear structure, radioactivity, and reactions; interaction of radiation and matter, and neutron moderation, neutron diffusion, the steady-state chain reaction, and reactor kinetics. At the level of Introduction to Nuclear Engineering, by Lamarch.

304 Introduction to Nuclear Science and Engineering II (also AE 448 and M&E 559) Spring. 3 credits. Prerequisite: NS&E 303.
3 lecs. D. D. Clark.
Introduction to aspects of nuclear reactor engineering and to controlled fusion. Topics include heat-transfer and safety problems in fission reactors; principles, configurations, and engineering problems of proposed fusion reactors; radiation detection, shielding, biological effects of radiation, and materials damage.

305 Introduction to Nuclear Science and Engineering III Spring 1 credit. Prerequisite: NS&E 303.
1 lec. D. D. Clark.
A one-hour reading and lecture course providing a more extensive development of the topics in nuclear physics introduced in NS&E 303. Recommended as a supplement to NS&E 303-304 for students who plan graduate work in nuclear science or engineering.

484 Introduction to Controlled Fusion: Principles and Technology (also EE 454 and M&E 559) Spring. 3 credits. Prerequisite: Physics 112, 213, and 214, or equivalent background in electricity and magnetism and mechanics, and permission of instructor. Intended for seniors and graduate students.
Introduction to the physical principles and technology underlying controlled-fusion power. Topics include fundamental aspects of the physics of ionized gases at high temperature (thermonuclear plasmas), requirements (in principle) for achievement of net power from fusion, technological problems of an actual fusion reactor, and progress of the fusion program toward overcoming these problems. Both magnetic and inertial confinement fusion are discussed, and comparisons are made between fusion and fission.

Operations Research and Industrial Engineering

115 Engineering Application of Operations Research (also Engr 115) Fall. Spring 3 credits. Enrollment not open to OR&E upperclass majors.
2 lecs. 1 lab.
For description see Engineering Common Courses.
[119 Introduction to Manufacturing Engineering (also Engr 119) Fall. Spring 3 credits. Enrollment not open to OR&E upperclass majors. Not offered 1986--87.
2 lecs. 1 lab.
For description see Engineering Common Courses.]

230 Discrete Mathematics Spring. 3 credits. Prerequisites: one year of calculus or permission of instructor.
3 lecs.
A broad but thorough introduction to topics of discrete mathematics of use in a variety of fields of science and engineering. Topics include basic combinatorics and counting techniques, recurrence relations and generating functions, introduction to modular arithmetic with application to coding theory and experimental designs, and basic notions of graph theory with applications in optimization such as maximum flow in a network and project planning.

260 Introductory Engineering Probability (also Engr 260) Fall. Spring. 3 credits. Prerequisite: first-year calculus.
3 lecs.
For description see Engineering Common Courses.

270 Basic Engineering Probability and Statistics Fall; also spring if staffing permits. 3 credits. Prerequisite: first-year calculus. Enrollment not open to OR&E upperclass majors.
3 lecs. Evening prelims.
For description see Engineering Common Courses.

320 Optimization I Fall. 4 credits. Prerequisite: Mathematics 294 or 221.
3 lecs. 1 rec.
Formulation of linear programming problems and solutions by the simplex method. Related topics such as sensitivity analysis, duality, and network programming. Applications include such models as resource allocation and production planning.

321 Optimization II Spring. 4 credits. Prerequisite: OR&E 320 or equivalent.
3 lecs. 1 rec.
A variety of optimization methods stressing extensions of linear programming and its applications but also including topics drawn from integer, dynamic, and nonlinear programming. Formulation and modeling are stressed as well as numerous applications.

350 Cost Accounting, Analysis, and Control Fall; also spring if staffing permits. 4 credits.
3 lecs. 1 computing-disc.
Principles of accounting, financial reports; job-order and process cost systems—historical and standard costs; cost characteristics and concepts for control, analysis, and decision making.

361 Introductory Engineering Stochastic Processes I Fall. Spring. 4 credits. Prerequisite: OR&E 260 or equivalent.
3 lecs. 1 rec.
Basic concepts and techniques of random processes are used to construct models for a variety of problems of practical interest. Topics include the Poisson process, Markov chains, renewal theory, models for queuing and reliability.

370 Introduction to Statistical Theory with Engineering Applications Spring; also fall if staffing permits. 4 credits. Prerequisite: OR&E 260 or equivalent.
3 lecs. 1 rec.
Provides a working knowledge of basic statistics as it is most often applied in engineering and a basis in statistical theory for continued study. Topics include a review of distributions of special interest in statistics; testing simple and composite hypotheses; point and interval estimation; correlation; linear regression.

410 Industrial Systems Analysis Spring. 4 credits. Prerequisite: OR&E 350 Corequisite: OR&E 370.
3 lecs. 1 computing session.
Engineering economic analysis, including engineering economy, replacement, taxation effects, decision making based on economic considerations. Operations analysis, including process flow, process evaluation, procedural analysis, resource layout, methods analysis and design, work measurement, job evaluation, quality control elements. Project planning and control.

417 Layout and Material Handling Systems Spring. 3 credits. Prerequisite: OR&E 361.
2 lecs. 1 rec.
Design of the layout of processes and storage areas and the material-handling system for movement of items. Typical equipment used. The functions of identification control, storage, movement, batching, merging, and dispersion. Introduction to new technologies.

421 Production Planning and Control Fall. 4 credits. Prerequisites: OR&E 320 and 361, or permission of instructor.
3 lecs. 1 rec.
Planning and control of large-scale production operations. Inventory control. Leveling, smoothing, and scheduling of production. Job-shop scheduling and dispatching. Demand forecasting. Economic and practical interpretation of planning and control procedures.

431 Discrete Models Spring. 4 credits. Prerequisite: OR&E 320 and CS 100 or permission of instructor.
3 lecs. 1 rec.
Basic concepts of graphs, networks, and discrete optimization. Fundamental models and applications, and algorithmic techniques for their analysis. Specific models studied include flows in networks, network synthesis, sequencing, partitioning, and fair allocation.

435 Introduction to Game Theory Fall. 3 credits.
3 lecs.
A broad survey of the mathematical theory of games, including such topics as two-person matrix and bimatrix games; cooperative and noncooperative n-person games; games in extensive, normal, and characteristic function form. Economic market games. Applications to weighted voting and cost allocation.

451 Economic Analysis of Engineering Systems Spring. 4 credits. Prerequisites: OR&E 260 and OR&E 350.
3 lecs. 1 computing session.
Financial planning, including cash-flow analysis and return on equity models. Engineering economic analysis, including discounted cash flows and taxation effects. Application of optimization techniques, including capacity expansion models. Issues in designing manufacturing systems. Case studies in designing an international distribution system and designing an automated factory. Student group project.

[462 Introductory Engineering Stochastic Processes II Fall. 4 credits. Prerequisite: OR&E 361 or equivalent. Not offered 1987--88.
3 lecs. 1 rec.
A selection of topics from the following: martingales, Markov and semi-Markov processes, optimal stopping. Examples and applications are drawn from several areas.]

471 Applications of Statistics to Engineering Problems Fall. 4 credits. Prerequisite: OR&E 370 or equivalent.
3 lecs. 1 rec.
Theory of multiple linear regression and its application to problems in engineering and the sciences, including graphic and analytic techniques useful in model building, analysis of data from experiments with qualitative factors, including one-way and two-way Anova models. Use of the computer as a tool for statistics is stressed.

[472 Statistical Decision Theory Spring. 3 credits. Prerequisite: OR&E 370 or equivalent. Not offered 1987--88.
3 lecs. 1 rec.
and forecasting are treated. As time permits other
design and control. Periodic and continuous review
operations.
model identification, estimation, diagnostic checking,
series, are covered in detail. The various stages of
Box-Jenkins models, which are versatile, widely used,
Multi-item and multi-echelon extensions. Dynamic and
3 credits. Prerequisite: OR&IE 361 or permission of

520 Operations Research I: Optimization I Fall. 4 credits. Prerequisite: OR&IE 320 or 520 or equivalent. Intended for graduate students in other fields. Lectures concurrent with OR&IE 320.

521 Optimization II Spring. 4 credits. Prerequisite: OR&IE 320 or 520 or equivalent. Intended for graduate students in other fields. Lectures concurrent with OR&IE 320.

523 Operations Research II: Introduction to Stochastic Modeling Spring. 4 credits. Prerequisite: OR&IE 260 or equivalent. Intended for graduate students in other fields. Lectures concurrent with OR&IE 361.

561 Queuing Theory and Its Applications Fall. 3 credits. Prerequisite: OR&IE 361 or permission of instructor. Not offered 1987–88.

562 Inventory Theory Spring. 4 credits. Prerequisite: OR&IE 427 or permission of instructor. Not offered 1987–88.

563 Applied Time-Series Analysis Fall. 3 credits. Prerequisite: OR&IE 361 and 370 and CS 211, or permission of instructor. 3 lecs; 1 rec.

632 Nonlinear Programming Fall. 3 credits. Prerequisite: OR&IE 630.

633 Graph Theory and Network Flows Spring. 3 credits. Prerequisite: permission of instructor. 1 lec.

636 Integer Programming Fall. 3 credits. Prerequisite: OR&IE 630. Not offered 1987–88.

652 Advanced Inventory Control Fall. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.

660 Applied Probability Fall. 4 credits. Prerequisite: advanced calculus. 3 lecs; 1 rec.

661 Applied Stochastic Processes Spring. 4 credits. Prerequisite: OR&IE 660 or equivalent. 3 lecs; 1 rec.

677 Dynamic Programming Fall. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.

680 Digital Systems Simulation Fall. 4 credits. Prerequisite: OR&IE 370 or equivalent.

680 Advanced Production and Inventory Planning Fall. 3 credits.

699 Project Fall, spring. 5 credits. For M.Eng. students.

700 Topics in Combinatorics, Graphs, and Networks. These include matching, matroids, polyhedral combinatorics, and optimization algorithms.

706 Convex Analysis Fall. 3 credits. Prerequisite: Mathematics 411 and 431, or permission of instructor. Not offered 1987–88.

707 Game Theory Spring. 3 credits. Prerequisite: Mathematics 411 or 431, or permission of instructor. Not offered 1987–88.

727 Mathematical Programming I and II 630, fall; 631, spring. 3 credits each term. Prerequisite: OR&IE 630, fall; 631, spring.

727 Dynamic Programming Fall. 3 credits. Prerequisite: permission of instructor. Not offered 1987–88.


730-631 Mathematical Programming I and II 630, fall, 631, spring. 3 credits each term. Prerequisite: advanced calculus and elementary linear algebra.

730 Mathematical Programming I Fall. 3 credits. Prerequisite: advanced calculus and elementary linear algebra.

[662 Advanced Stochastic Processes Fall
3 credits. Prerequisite: OR&IE 661 or equivalent. Not offered 1987–88.
3 lecs.
A selection of topics from the following: stationary processes, Levy processes, diffusion processes, point processes, martingales, regenerative phenomena, stochastic calculus, weak convergence.]

[663 Time-Series Analysis Spring. 3 credits.
Prerequisite: OR&IE 660 or equivalent. Not offered 1987–88.
3 lecs.

[664 Deterministic and Stochastic Control Fall.
3 credits. Prerequisite: OR&IE 661 or equivalent.
3 lecs.
Topics include elements of calculus of variations, Pontryagin's maximum principle, Markov decision processes, dynamic programming. Problems in filtering and prediction, production planning and inventory control, congestion phenomena, storage models, and environmental management are discussed.]

[665 Advanced Queuing Theory Spring. 3 credits.
Prerequisite: OR&IE 660 or equivalent.
3 lecs.
A study of stochastic processes arising in a class of problems including congestion, storage, dams, and insurance. The treatment is self-contained. Transient behavior of the processes is emphasized. Heavy-traffic situations are investigated.]

[670 Statistical Principles Spring. 4 credits.
Prerequisite: OR&IE 660 or equivalent.
3 lecs, 1 rec.
Review of distribution theory of special interest in statistics: normal, chi-square, binomial, Poisson, t, and F, introduction to statistical decision theory; sufficient statistics; theory of minimum variance unbiased point estimation; maximum likelihood and Bayes estimation; basic principles of hypothesis testing, including Neyman-Pearson Lemma and likelihood ratio principle, confidence interval construction; introduction to linear models.]

[671 Intermediate Applied Statistics Fall.
3 credits. Prerequisite: OR&IE 670 or equivalent.
3 lecs.
Statistical inference based on the general linear model; least-squares estimators and their optimality properties, likelihood ratio test and corresponding confidence regions; simultaneous inference. Applications in regression analysis and ANOVA models. Variance components and mixed models. Use of the computer as a tool for statistics is stressed.]

[672 Statistical Decision Theory Fall. 3 credits.
Prerequisite: OR&IE 471 or 670 or equivalent. Not offered 1987–88.
3 lecs.
The general problem of statistical decision theory and its applications. Comparison of decision rules, Bayes, admissible, and minimax rules. Problems involving sequences of decisions over time. Use of the sample cdf and other simple nonparametric methods. Applications.]

[673 Nonparametric Statistical Analysis Fall.
3 credits. Prerequisite: OR&IE 670 or permission of instructor. Not offered 1987–88.
3 lecs.

[674 Design of Experiments Spring. 3 credits.
Prerequisite: OR&IE 671 or permission of instructor. Not offered 1987–88.
3 lecs.
Use and analysis of experimental designs such as randomized blocks, balanced incomplete blocks, and Latin squares; analysis of variance and covariance, factorial experiments; statistical problems associated with finding best operating conditions; response-surface analysis.]

[675 Statistical Analysis of Discrete Data Spring.
Varieties of categorical data: cross classifications and contingency tables; simultaneous estimation of parameters; tests for independence; multidimensional tables and log-linear models; maximum likelihood and weighted least-squares estimation; logistic regression.]

[676 Statistical Analysis of Life Data Spring.

[677 Statistical Selection and Ranking Procedures Fall.
3 credits. Prerequisite: OR&IE 674 or permission of instructor.
3 lecs.
A study of multiple-decision problems, in which a choice must be made among two or more courses of action. Major emphasis is on selection and ranking problems involving choosing the "best" category where goodness is measured in terms of a particular parameter of interest. Statistical formulations of such problems; indifference-zone, subset, and other approximation ideas. Single-stage, two-stage, and sequential procedures. Applications. Recent developments.]

[680 Simulation Spring. 3 credits.
Prerequisite: permission of instructor. Not offered 1987–88.
3 lecs.
An advanced version of OR&IE 580, intended for Ph.D-level students.]

[728–729 Selected Topics in Applied Operations Research Fall, spring. Credit to be arranged.
Current research topics dealing with applications of operations research.]

[738–739 Selected Topics in Mathematical Programming Fall, spring. Credit to be arranged.
Current research topics in mathematical programming.]

[768–799 Selected Topics in Applied Probability Fall, spring. Credit to be arranged.
Topics chosen from current literature and research areas of the staff.]

[778–779 Selected Topics in Applied Statistics Fall, spring. Credit to be arranged.
Topics chosen from current literature and research of the staff.]

[790 Special Investigations Fall, spring. Credit to be arranged.
For individuals or small groups: Study of special topics or problems.]

[799 Thesis Research Fall, spring. Credit to be arranged.
For individuals doing thesis research for master's or doctoral degrees.]

[891 Operations Research Graduate Colloquium Fall, spring. 1 credit.
A weekly 1-hour meeting devoted to presentations by distinguished visitors, by faculty members, and by advanced graduate students on topics of current research in the field of operations research.]

[893–894 Applied OR&IE Colloquium (894 also M&E 594) 893, fall; 894, spring. 1 credit each term.
A weekly meeting for Master of Engineering Students. Discussion of various topics on manufacturing with faculty members and outside speakers.]

**Theoretical and Applied Mechanics**

**Basics in Engineering Mathematics and Mechanics**

[202 Mechanics of Solids (also Engr 202) Fall, spring. 3 credits.
Prerequisite: coregistration in Mathematics 293.
2 lecs, 1 rec, 4 labs each semester, evening exams. For description see Engineering Common Courses.]

[203 Dynamics (also Engr 203) Fall, spring.
3 credits. Prerequisites: coregistration in Mathematics 294.
2 lecs, 1 rec, 4 labs each semester, evening exams. For description see Engineering Common Courses.]

[294 Engineering Mathematics Fall, spring.
4 credits. Prerequisite: Mathematics 192 or 194.
2 lecs, 1 rec, 4 labs during semester, evening exams. Partial derivatives and multiple integrals; first- and second-order ordinary differential equations with applications in the physical and engineering sciences. Includes microcomputer experiments using computer algebra to solve problems.]

[295 Engineering Mathematics Fall, spring.
4 credits. Prerequisite: Mathematics 293.
2 lecs, 1 rec, 4 labs during semester, evening exams. Vectors and matrices; eigenvalue problems, and applications to systems of linear differential equations. Vector calculus. Includes microcomputer experiments using computer algebra to solve problems.]

**Engineering Mathematics**

[310 Advanced Engineering Analysis I Fall, spring.
3 credits. Prerequisite: Mathematics 294 or equivalent.
2 lecs, 1 rec.
Ordinary differential equations as applied in engineering context. Analytical and numerical methods. Special functions, initial value, boundary value, and eigenvalue problems, and applications to systems of linear differential equations. Vector calculus. Boundary-value problems and introduction to Fourier series. Includes microcomputer experiments using computer algebra to solve problems.]

**Advanced Engineering Analysis II**

[311 Advanced Engineering Analysis II Spring.
3 credits. Prerequisite: T&M 310 or equivalent.
Functions of several variables, introduction to complex variables, analytic functions, conformal mapping, method of residues. Application to the solution of Laplace's equation, and transform inversion techniques. Examples drawn from fluid mechanics, heat transfer, electromagnetics, and elasticity.]

[610 Methods of Applied Mathematics I Fall.
3 credits. Intended for beginning graduate students in engineering and science. An intensive course, requiring more time than is normally available to undergraduates (see T&M 310–311) but open to exceptional undergraduates with permission of instructor.
3 lecs.]
Emphasis is on applications. Linear algebra, calculus of several variables, vector analysis, series, ordinary differential equations, complex variables.

611 Methods of Applied Mathematics II Spring 3 credits. Prerequisite: T&AM 610 or equivalent. 3 lecs. Emphasis on applications. Partial differential equations, transform techniques, tensor analysis, calculus of variations.

613 Methods of Applied Mathematics IIIa Fall 2 credits. Prerequisite: T&AM 611 or equivalent. First of an 8-credit sequence (T&AM 613, 614, 615, 616) that develops advanced mathematical techniques for engineering problems. Review of complex variable theory; conformal mapping; complex integral calculus. Nonlinear partial differential equations; general theory of characteristics.

614 Methods of Applied Mathematics IIIb Spring 2 credits. Prerequisite: T&AM 613 or equivalent. Integral transforms for partial differential equations. Green’s function; asymptotics, including steepest descent and stationary phase. Wiener-Hopf technique. Problems drawn from vibrations and acoustics, fluid mechanics and elasticity, heat transfer, and electromagnetics.

615 Methods of Applied Mathematics IVa Fall 2 credits. Prerequisite: T&AM 611 or equivalent. In context of applications: regular and singular perturbation theory, method of matched asymptotic expansions, two timing (method of multiple scales), WKBJ approximation.

616 Methods of Applied Mathematics IVb Spring 2 credits. Prerequisite: concurrent registration in T&AM 614 or equivalent. In context of applications: Hilbert-Schmidt and Fredholm theories of integral equations, Wiener-Hopf equations with application to finite interval, Carleman equation and its generalization, effective approximations.

617 Computer Algebra in Applied Mathematics Fall 2 credits. Prerequisite: T&AM 610–611 or equivalent. This course provides a general overview of the basic principles of symbolic computation and computer algebra. An introduction to MACSYMA, a computer programming system that permits the exact algebraic manipulation of expressions involving polynomials and trigonometric functions, with applications to engineering analysis. The system includes symbolic differentiation and integration as well as symbolic matrix inversion. Applications will include Lagrange’s and Hamilton’s equations and the Rayleigh-Ritz and Fourier Series solutions of differential equations, and perturbation methods for systems with a small parameter.

Experimental Mechanics

569 Sensors Fall 3 credits. 3 lecs, 4 labs. This course deals with the general properties of sensors used in measurement and process-control applications involving thermal and mechanical quantities. Studied are transducer models representing the operation of sensors based on a broad range of physical transduction phenomena. Attention is also given to signal-processing algorithms for processing sensor signals in a variety of measurement and characterization applications.


Continuum Mechanics and Inelasticity

551 Principles and Applications of Solid Mechanics Fall 3 credits. Prerequisite: T&AM 610 or equivalent. Introduction to stress, strain, momentum balance, energy principles, balance laws, and selected topics in classical elasticity. Mechanics of plates and shells, including analytical and numerical methods. Foundation for advanced courses in elasticity, plasticity, fracture, and elastic waves.

555 Composite Materials (also M&E 615 and M&E 616) Spring 4 credits. Prerequisites: Eng. 202 and 611, graduate standing, and permission of instructor. Brief history of composite materials; types, geometries, fiber types, and structures; polymer matrices and deformation properties; orthotropic elasticity; stress-strain analysis of lamina and laminates; micromechanics of deformation and stress transfer, effective moduli, theories of strength and fatigue, nondestructive testing and inspection, applications of composites, environmental effects.

561 Continuum Mechanics and Thermodynamics Fall 3 credits. Offered alternate years. Kinematics, conservation laws, the entropy inequality, constitutive equations, frame indifference, material symmetry.


752 Advanced Subjects in Continuum Mechanics of Current Interest Spring 3 credits. Prerequisite: T&AM 651. Offered alternate years. Polymer rheology using functional or state variables. Continuum theory for rapid shear flows of granular materials. Chemically driven flows, percolation, and finite deformation in biological porous-elastic solids.


759 Boundary-Element Methods in Solid and Fluid Mechanics (also CEE 639) Fall 3 credits. Prerequisites: T&AM 610 or 611 or equivalent. Offered alternate years. This course is taught jointly by faculty members from T&AM and CEE. Its aim is to survey a wide range of applications of the BEM in solid and fluid mechanics. Some of the topics to be covered will be torsion of shafts, ground-water flow propagation in solids and liquids, diffusion, bending of plates, and linear elasticity. Problems involving nonhomogeneous media, as well as nonlinear problems like plastic or viscoelastic deformation, small-strain, large-strain, large-rotation, etc., will be discussed if time permits. The emphasis in the class will be on computer applications.

Elasticity and Waves

574 Mechanical Vibrations and Waves Spring 3 credits. Two 1 ½-hour lecs, 4 labs each semester. Review of vibrations of discrete systems, including multi-degree-of-freedom vibrations. Unified treatment of vibrations and wave phenomena in continuous elastic systems, including strings, rods, beams, membranes, and plates. Approaches for finding natural modes and frequencies. Dispersion and group velocity. Transient response of discrete and continuous systems.


666 Fundamentals of Acoustics Spring 3 credits. 3 lecs, biweekly labs. Introduction to the principles and theories of acoustics. The vibrations of strings, bars, membranes, and plates; plate and spherical acoustic waves; transmission phenomena; resonators and filters; waves in solids and fluids. Application is made to sonic and ultrasonic transducers, music and noise, and architectural acoustics, and an introduction is given to the digital processing of acoustic signals. Laboratory work is required. At the level of Fundamentals of Acoustics, by Kinsler, Frey, Coppen, and Sanders.

765 Nonlinear Elasticity Fall 3 credits. Prerequisites: T&AM 551 and 611 or equivalent. Offered alternate years. Not offered 1987–88. Review of kinematics and constitutive theory appropriate for large deformations of nonlinearly elastic bodies. The basic field equations of nonlinear elastostatics and elastodynamics. Exact solutions of special problems. Linearization and stability nonlinear theories of thin structural members and their relationship to the three-dimensional theory. Introduction to static bifurcation theory with applications to strings, rods, plates, and shells.


Dynamics and Space Mechanics

570 Intermediate Dynamics Fall 3 credits. Two 1 ½-hour lecs. Vector and matrix methods for kinematics, Lagrangian and Newtonian mechanics for particles and rigid bodies, Euler’s equations for rotating bodies, central-force motion. Small vibrations and stability. Application to robotics, gyroscopes, orbital and spacecraft dynamics.

671 Advanced Dynamics Spring 3 credits. Prerequisite: T&AM 570 or equivalent. Offered alternate years. Review of Lagrangian mechanics; Hamilton’s principle, the principle of least action, and related topics from the calculus of variations. Hamilton’s canonical equations; approximate methods for two-degrees-of-freedom systems (Lie transforms); canonical transformations and Hamilton-Jacobi theory. KAM theory. This course will use computer algebra (MACSYMA). No prior experience will be assumed.

Theoretical and Applied Mechanics 299
672 Celestial Mechanics (also Astronomy 579) Spring. 3 credits. Offered alternate years. Two 1 1/4-hour lecs. Description of orbits; 2-body, 3-body, and n-body problems; Hill curves, libration points and their stability; close encounters; perturbations; osculating elements, perturbation equations; effects of gravitational potentials, atmospheric drag, and solar radiation forces on satellite orbits; secular perturbations, resonances, mechanics of planetary rings.

[873 Mechanics of the Solar System (also Astronomy 571) Fall. 3 credits. Prerequisite: an undergraduate course in dynamics. Offered alternate years. Not offered 1986–87. Two 1 1/4-hr lecs. Gravitational potentials, planetary gravity fields. Free and forced oscillations. Chaotic motions, phase plane methods, method of picone-cells, conservation systems. General autonomous systems, equilibrium and periodic solutions, linearization and Lyapunov stability criteria, Poincare-Bendixson theorem. Quantitative analysis of weakly nonlinear systems in free and forced vibrations, perturbation methods, Krylov-Bogoliubov method. Applications to problems in mechanics. This course will use computer algebra (MACSYMA). No prior experience will be assumed.]


890 Master's Degree Research in Theoretical and Applied Mechanics Fall, spring; 1–9 credits, as arranged. S-U grades optional. Thesis or independent research at the M.S. level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

900 Doctoral Research in Theoretical and Applied Mechanics Fall, spring; 1–9 credits, as arranged. S-U grades optional. Thesis or independent research at the Ph.D. level on a subject of theoretical and applied mechanics. Research is under the guidance of a faculty member.

Faculty Roster

Abel, John F., Ph.D., U. of California at Berkeley. Prof., Civil and Environmental Engineering
Atbright, Louis D., Ph.D., Cornell U. Assoc. Prof., Agricultural Engineering
Alimendinger, Richard, Ph.D., Stanford U. Asst. Prof., Geological Sciences
Aneshansley, Daniel J., Ph.D., Cornell U. Assoc. Prof., Agricultural Engineering
Anton, A. Brad, Ph.D., Calif. Inst. of Technology. Asst. Prof., Chemical Engineering
Ast, Donald L., Ph.D. Princeton U. Assoc. Prof., Mechanical and Aerospace Engineering
Babaoglu, Ozalp, Ph.D., U. of California at Berkeley. Prof., Civil and Environmental Engineering
Barbi, Andrea, Ph.D., Columbia U. Adjunct Prof., Geological Sciences
Bartel, Donald L., Ph.D. U. of Iowa. Prof., Mechanical and Aerospace Engineering
Bartzsch, A. J., Ph.D., Purdue U. Asst. Prof., Agricultural Engineering
Bassett, William A., Ph.D., Columbia U. Prof., Geological Sciences
Battar, Beramor, Ph.D., M. of Mass. Eng. Prof., Mechanical and Aerospace Engineering
Bayer, Anthony, Ph.D., M. of Mass. Eng. Prof., Electrical Engineering
Bilardi, Gianfranco, Ph.D., of Illinois. Asst. Prof., Computer Science
Biljera, Louis J., Ph.D., City of New York. Prof., Operations Research and Industrial Engineering
Bird, John M., Ph.D., Rensselaer Polytechnic Inst. Prof., Geological Sciences
Birman, Kenneth P., Ph.D., U. of California at Berkeley. Asst. Prof., Computer Science
Bogardi, James J., Ph.D., Cornell U. Assoc. Prof., Civil and Environmental Engineering
Bolton, Dina, Ph.D., U. of Wisconsin at Madison. Asst. Prof., Computer Science
Blyth, John Ph.D., Glasgow U. (Scotland). Prof., Materials Science and Engineering
Blond, Robert G., Ph.D., Cornell U. Assoc. Prof., Operations Research and Industrial Engineering
Bloom, Arthur L., Ph.D., Yale U. Prof., Geological Sciences
Bojanczyk, Adam W., Ph.D., of Warsaw (Poland). Asst. Prof., Electrical Engineering
Bolgian, Ralph, Jr., Ph.D., Cornell U. Prof., Electrical Engineering
Booher, John F., Ph.D., Cornell U. Prof., Mechanical and Aerospace Engineering
Brown, Larry D., Ph.D., Cornell U. Assoc. Prof., Geological Sciences
Bruns, Joseph A., Ph.D., Cornell U. Prof., Theoretical and Applied Mechanics
Budyko, M. I., Ph.D., U. of Moscow. Prof., Geographical Sciences
Caddy, K. Bingham, Ph.D., Mass. Inst. of Technology Prof., Nuclear Science and Engineering
Capranica, Robert R., Ph.D., Mass. Inst. of Technology Prof., Electrical Engineering
Cathles, Lawrence M., Ph.D., Princeton U. Prof., Geophysical Sciences
Caughley, David A., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
Chang, Hsiao-Dong, Ph.D., U. of California at Berkeley. Asst. Prof., Electrical Engineering
Crisp, John L., Ph.D., U. of Chicago. Prof., Geological Sciences
Crunz, Paul, Ph.D., Oxford U. (England). Asst. Prof., Chemical Engineering
Clark, David R., Ph.D., U. of California at Berkeley. Prof., Nuclear Science and Engineering
Cohen, Claude, Ph.D., Princeton U. Assoc. Prof., Chemical Engineering
Coleman, Thomas F., Ph.D. U. of Waterloo. Assoc. Prof., Computer Science
Compton, Richard C., Ph.D., Calif. Inst. of Technology. Asst. Prof., Electrical Engineering
Condie, Robert B., Ph.D., U. of Wisconsin. Prof., Computer Science
Cook, W. David, Ph.D., U. of Waterloo (Canada). Asst. Prof., Operations Research and Industrial Engineering
Cooke, John Robert, Ph.D., North Carolina State U. Assoc. Prof., Electrical Engineering
Cool, Terrell A., Ph.D., Calif. Inst. of Technology. Prof., Applied and Engineering Physics
Dawson, Paul R., Ph.D., Colorado State U. Assoc. Prof., Mechanical and Aerospace Engineering
deBoer, P. Tobias, Ph.D., U. of Maryland. Prof., Mechanical and Aerospace Engineering
Delchamps, David F., Ph.D., Harvard U. Asst. Prof., Electrical Engineering
Dick, Richard J., Ph.D., U. of Illinois. Joseph P. Riley Professor of Engineering, Civil and Environmental Engineering
Dieckmann, Rudiger, Ph.D., Technical U. of Clausthal. Prof., Materials Science and Engineering
Donald, Bruce, Ph.D., Mass. Inst. of Technology Asst. Prof., Computer Science
Eastman, Lester F., Ph.D., Cornell U. Prof., Electrical Engineering
Farley, Donald T., Ph.D., Cornell U. Prof., Electrical Engineering
Ferrier, Terrence L., Ph.D., Harvard U. Prof., Electrical Engineering
Finn, Robert K., Ph.D., U. of Minnesota. Prof., Chemical Engineering
Fisher, Gordon P. D.E., Johns Hopkins U. Prof., Civil and Environmental Engineering
Fleischmann, Hans H., Ph.D., Technische Hoch., Munich (Germany). Prof., Applied and Engineering Physics
Furr, Ronald B., Ph.D., Iowa State U. Prof., Agricultural Engineering
Gebremedhin, Kifle G., Ph.D., U. of Wisconsin. Asst. Prof., Agricultural Engineering
George, Albert R., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
Gerzely, Peter R., Ph.D., U. of Illinois. Prof., Civil and Environmental Engineering
Giannenlis, Emmanuel, Ph.D., Virginia State U. Prof., Material and Engineering Sciences
Gilbert, John R., Ph.D., Stanford U. Asst. Prof., Computer Science
Gossett, James R., Ph.D., Stanford U. Assoc. Prof., Civil and Environmental Engineering
Gouldin, Frederick C., Ph.D., Princeton U. Prof., Mechanical and Aerospace Engineering
Greenberg, Donald P., Ph.D., Cornell U. Professor at Large. Engineering
Gries, David J., Ph.D., Technische Hoch., Munich (Germany). Prof., Computer Science
Graduate School

Administration

Alison P Casaret, dean
David A. Msung, associate dean
Joycelyn R. Hart, assistant dean
Kenneth A Strike, secretary of the graduate faculty

Graduate study at Cornell is pursued through the Graduate School, which administers the many graduate fields of study, or through the various graduate professional schools and colleges. Programs leading to the degrees of Doctor of Law (J.D.), Doctor of Medicine (M.D.), Doctor of Veterinary Medicine (D.V.M.), and Master of Business Administration (M.B.A.) are not administered by the Graduate School. Information on those programs can be obtained from the Law School, the Medical College (New York City), the College of Veterinary Medicine, and the Johnson Graduate School of Management respectively.

Graduate School

The graduate program at Cornell permits an unusual degree of accommodation to the needs and interests of the individual student. Degree requirements are kept to a minimum. There are no specific course or credit requirements for the advanced general degrees of Master of Arts, Master of Science, and Doctor of Philosophy, but only such general requirements that best accomplish the aim of graduate study: a period of study in residence, the mastery of one subject, adequate knowledge of allied subjects, oral examinations to establish competency for presentation of a thesis, and a satisfactory thesis. Certain advanced professional degree programs have specific course or credit requirements that are determined by the faculty of the professional school or college in which the degrees are offered.

A close working relationship between the student and faculty members is essential to the graduate program at Cornell. Under the Special Committee system the student is guided by, and works with, at least two or three faculty members chosen by the student to represent his or her major and minor subjects. The major subject representative is the chairperson of the Special Committee and usually has the primary responsibility for directing the student's thesis research.

Students who want to use the university's facilities for intensive specialized training only and who do not want to become degree candidates may apply for admission as non-degree candidates.

Requirements for Admission

To be admitted to the Graduate School, an applicant should:

1) hold a baccalaureate degree or its equivalent, granted by a faculty or university of recognized standing;
2) have adequate preparation for graduate study in the chosen field of instruction;
3) have fluent command of the English language;
4) present evidence of promise in advanced study and research; and
5) have a combined score of at least 1,200 in the verbal and quantitative Aptitude Tests of the Graduate Record Examinations for those fields that require the GREs.

Before admission can be final, all applicants whose native language is not English must provide proof of competency in the English language. Acceptable proof could be

1) a Test of English as a Foreign Language (TOEFL) score of 550 or higher;
2) a degree from a college or university in a country where the native language is English; or
3) two or more years of study in an undergraduate or graduate program in a country where the native language is English.

Information on times and places for the TOEFL examination and Graduate Record Examinations and application forms may be obtained from the Educational Testing Service, Princeton, New Jersey 08540, U.S.A.

Applications for admission to the Graduate School may be submitted at any time during the year. Many fields, however, require that applicants for fall admission submit their completed applications by January 15.

Applications who are also applying for Cornell Graduate School fellowship consideration must submit their completed applications and supporting credentials by January 15.

Inquiries regarding admission and fellowships should be addressed to the Graduate School Admissions Office, Cornell University, Sage Graduate Center, Ithaca, New York 14853-6201.

Information concerning admission requirements and courses of study for degrees not administered by the Graduate School may be obtained from the several schools and colleges that administer them (see "Administration," above).

Inquiries regarding facilities for advanced study and research in a given field, special requirements for such study and research, and opportunities for teaching and research assistantships should be addressed to the graduate faculty representative in the particular field.

Graduate students will find more thorough information in the Announcement of the Graduate School and in Graduate Study at Cornell University. Both publications are available from the Graduate School, Cornell University, Sage Graduate Center, Ithaca, New York 14853-6201.
School of Hotel Administration

Administration

John J. Clark, Jr., dean
David C. Dunn, assistant dean for academic affairs
Allan A. Lentini, director of business and administration
Michael H. Redlin, graduate faculty representative
Melinda Codd, director of the M.P.S. program
Cheryl S. Farrell, director of admissions and financial aid
Howard Kaier, general manager of the Statler Hotel and Conference Center
Harry R. Keller, director of alumni affairs
Fred Antil, director of placement and corporate relations
Mary K. Milks, registrar
Katherine S. Laurence, acting librarian
Maureen McKenna, external-programs director
Shelley Semmler, director of development

Degree Program

Hotel and Restaurant Administration

Degree

B.S.
M.P.S.
M.S.
Ph.D.

Facilities

Statler Hall, Statler Hall is a unique educational building designed expressly to meet the needs of the faculty and students of the School of Hotel Administration. The building has three parts: a classroom section, a full-service practice hotel and conference center, and an auditorium with complete stage facilities. This provides the school with classrooms, lecture rooms, laboratories, a library, a video and computer center, auditoriums, and offices for instruction and research in hotel administration.

Statler Hall's facilities have periodically been upgraded to reflect technological advances and changes in the industry. Now, some thirty-five years after the building was constructed, Statler Hall is being renovated and expanded to support the school's teaching and research activities and the hotel's many functions. The building is scheduled to reopen before the fall semester of 1989.

The improvements to Statler Hall will provide students with training and work experience in a property similar to those in which they will work after graduation, and they will facilitate the implementation of the school's new academic and continuing-education programs.

The Howard B. Meek Library, which will be relocated during the renovation, provides an extensive collection of publications on hotel and restaurant operation and related subjects. The library has received many gifts of display materials and personal collections—among them the Herndon and Vehling collections.

Statler Hotel and Conference Center. Statler Inn was razed in the fall of 1986 and is presently being rebuilt. The new hotel will have 150 guest rooms, a conference center, and a variety of food-service areas.

After reconstruction, scheduled to be completed by the fall of 1988, the Statler Hotel and Conference Center will be an industry showcase, one that demonstrates the very finest in hospitality and hospitality-education practices. The Statler is an independent, self-sustaining operation. It provides quality food, beverage, meeting, and lodging services to the Cornell community and campus visitors, including parents and those who visit Cornell as part of the application process. In addition, the Statler is a practice-management facility for certain classes and for independent-study projects. When the Statler Hotel reopens, it will offer part-time jobs to approximately two hundred students each semester; preference is given to hotel students.

Curriculum

The School of Hotel Administration offers training in the numerous disciplines required for modern management, including accounting, finance, marketing, operations, communication, properties management, MIS/computers, law, and human-resources management. The school's graduates hold executive positions in a variety of industries but are especially well represented in the management of hospitality-related enterprises, including the lodging, food-service, and travel industries.

Students are encouraged to pursue a broad range of courses, including those in the humanities, as preparation for assuming positions in the business community. Included in the basic curriculum are courses in financial management, food and beverage operations, administration, and physical-plant management.

To satisfy degree requirements, every undergraduate enrolled in the School of Hotel Administration must complete a minimum of two summer periods of ten weeks each (or the equivalent) of full-time, supervised, relevant employment and file acceptable reports for each work period.

The basic program leading to the degree in hotel administration, as set forth below, is enriched by a broad selection of free and distributive elective courses offered by the school and elsewhere in the University.

The school's programs for advanced degrees include those of Master of Professional Studies, Master of Science, and Doctor of Philosophy. For more complete information about undergraduate and graduate program requirements, see the school's admissions catalog. For further information on graduate programs, the reader should consult the Announcement of the Graduate School or contact Professor Michael H. Redlin, the school's graduate faculty representative.

Requirements for Graduation

Because the school is currently in the middle of a four-year process to revise its curricula, the requirements for graduation for students who enter after June 1985 are different from the requirements for students who entered prior to June 1985. Students should consult with their adviser or the school's registrar for the specific requirements that apply to them. Regularly enrolled students in the School of Hotel Administration are candidates for the degree of Bachelor of Science. The requirements for students who matriculate after June 1985 are:

1) completion of eight terms in residence;
2) completion, with a minimum average of 2.0, of 120 required and elective credits, as set forth in the table below;
3) completion of 12 credits in a subject concentration;
4) completion of two units of practice credit prior to the last term of residence, as defined below;
5) completion of the University requirement in physical education during the first two terms of residence;
6) attainment of a grade-point average of at least 2.0 in the final semester.

*Students who plan to attend summer school at Cornell or elsewhere must keep in mind the degree requirement of a minimum of two summer periods of ten weeks each (or the equivalent) of full-time, supervised, relevant employment.

Suggested course programs also appear on the following pages. The core courses account for 67 of the 120 credits needed for graduation, the selected subject concentration accounts for 12 credits, and 18 credits are allotted for distributive electives. The remaining 23 credits are earned in courses chosen from the offerings of any college of the University, provided that the customary requirements for admission to such courses are met.

Students in the School of Hotel Administration who plan to attend summer school at Cornell or elsewhere or who propose to attend any other university, with the expectation that the credit earned will be counted toward the Cornell degree in hotel administration, must obtain the approval of the school in advance. Without advance approval, such credit may not count toward the degree.

Credit earned in military science, aerospace studies, or naval-science courses may be counted in the 23-credit group of free electives.

All students are required by the University to take two courses in physical education, but no credit toward the academic degree is allowed for these courses.

Grading System

Letter grades ranging from A + to F are given to indicate academic performance in each course. These letter grades are assigned a numerical weight for each term average as follows: A equivalent to 4.0; B to 3.0; C to 2.0; D to 1.0; F to 0.0. For good standing, the student must maintain a minimum average of 2.0. In order to graduate, a cumulative average of 2.0 and a final-term average of 2.0 are required as minimums. Of the free elective courses, a maximum of four credits each term may be taken on a "satisfactory-unsatisfactory" (S-U) basis.

Students whose term averages are at least 3.3 and are composed of at least 12 credits of letter grades with no unsatisfactory or incomplete grades are honored by being placed on the Dean's List.

Practice-Credit Requirement

As part of degree requirements, each undergraduate enrolled in the School of Hotel Administration must complete a specific set of practice-credit requirements. These requirements are set forth in the Practice Credit Work Handbook for Undergraduates in the School of Hotel Administration. Copies of this document are made available to enrolled students upon request by the school's registrar.

A limited number of upperclass students are encouraged to enroll in management-intern programs that entail six to eight months of on-the-job managerial instruction and experience. For the details on these programs, see "Directed Study," on the following pages.

Course Requirements for Graduation

Required courses as of June 1985

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organization Management</td>
<td>Hotel Administration 103, 303, 403</td>
</tr>
<tr>
<td>Human-Resources Management</td>
<td>Hotel Administration 211, 212</td>
</tr>
<tr>
<td>Financial Management</td>
<td>Hotel Administration 225, 226, 325</td>
</tr>
<tr>
<td>Food and Beverage Management</td>
<td>Hotel Administration 135, 235, 335</td>
</tr>
<tr>
<td>Marketing and Tourism</td>
<td>Hotel Administration 243</td>
</tr>
<tr>
<td>Properties Management</td>
<td>Hotel Administration 255, 355</td>
</tr>
</tbody>
</table>

Students transferring from other colleges and universities may be allowed appropriate credit against the residence requirement at the time of admission. Transfer students must complete a minimum of five semesters in the program.
Communication: Hotel Administration 165, 365 6
MIS/Computers: Hotel Administration 174 3
Law: Hotel Administration 387 3
Quantitative Methods: I&LR 210 3
Concentration: Economics 101, 102 6
Specifically required credits 67
Concentration 12
Distributive electives 18
Free electives 23
Total credits required for graduation 120

Undergraduate Program of Study

The undergraduate curriculum of the School of Hotel Administration is continually being revised and expanded. In some cases, the numbers of old and new courses overlap. Students are reminded that the most accurate information regarding courses offered during any given semester may be found in the supplement issued for that semester by the school's registrar.

Typical Course Sequences

The following arrangements of courses tend to be more fixed in the freshman and sophomore years, with a greater degree of flexibility characterizing the upperclass years.

Freshman Year

Typically, a freshman schedule will consist of 14 to 16 credits each term, to include the following:

Required courses Credits
H Adm 103, Principles of Management 3
H Adm 135, Culinary Theory and Practice 4
H Adm 165, Introduction to Writing for Business 3
H Adm 174, Information Systems 3
ILR 210, Quantitative Methods 3
Econ 101, Microeconomics 3
Econ 102, Macroeconomics 3
Distributive electives 6
Free electives 0–4
Total 28–32

Sophomore Year

Required courses Credits
H Adm 211, The Management of Personnel 3
H Adm 212, Human Relations 3
H Adm 225, Financial Accounting 3
H Adm 226, Financial Management 4
H Adm 235, Food and Beverage Management 4
H Adm 243, Principles of Marketing 3
H Adm 255, Facilities Development and Planning 3
Distributive electives 3–6
Free electives 3–6
Total 29–35

Junior Year

Required courses Credits
H Adm 303, Organizational Processes and Design 3
H Adm 325, Hospitality Financial Management 3
H Adm 335, Restaurant Management 4
H Adm 355, Hospitality Facilities Construction and Operation 3
H Adm 365, Effective Oral Communication in Organizations 3
H Adm 387, Business and Hospitality Law Concentration 6
Electives 3–6
Total 28–31

Senior Year

Required courses Credits
H Adm 403, Integrative Management Capstone 6
Free electives 15–26
Total 24–35

Programs in Special Areas

While completing the required courses leading to the bachelor's degree, undergraduates in the school must also select a concentration: 12 elective credits in a major area of instruction. These include organization management, human-resources management, financial management, food and beverage management, marketing, and properties management.

When the student selects one of these major fields of concentration, he or she should consult the coordinator of instruction in that area during the sophomore year to plan the sequence of elective courses that will best fit his or her program.

A list of elective courses offered in the school's special areas of instruction is provided below.

Elective Courses in Hotel Administration

The following is a list of courses currently offered within the School of Hotel Administration that may, as appropriate, be used in partial or full satisfaction of the specified area concentration and the free elective allocation.

First digit of the course number is in general indicative of the level of the course, while the second digit indicates the curricular area, according to the following scheme:

First digit
0—organization management
1—human-resources management
2—financial management
3—food and beverage management
4—marketing and tourism
5—properties management
6—communication
7—MIS/computers
8—law
9—other

Second digit
0—organization management
1—human-resources management
2—financial management
3—food and beverage management
4—marketing and tourism
5—properties management
6—communication
7—MIS/computers
8—law
9—other

Organization Management Credits
H Adm 102, Distinguished Management Organization Credits
Lectures 1
H Adm 203, Club Management 2
H Adm 204, Franchising in the Hospitality Industry 2
H Adm 205, Resort and Condominium Management 3
H Adm 304, Room Division Management—Front Office and Reservations 2
H Adm 401, Seminar in Management Principles 2
H Adm 402, Hospitality-Management Seminar 1
H Adm 403, Management Organization of the Small Business 3
H Adm 406, Integrated Studies in the Hospitality Industry 3
H Adm 407, Seminar in Hotel Operations 2
H Adm 408, Casino Management 2
H Adm 502, Airline Management 3
H Adm 600, Undergraduate Independent Study—Organization Management V
H Adm 601, Management Intern Program I—Operations 6
H Adm 602, Management Intern Program II—Academic 6
H Adm 603, Hotel Ezra Cornell V

Undergraduate Program of Study 305

H Adm 700, Graduate Independent Research—Organization Management V
H Adm 701, Graduate Seminar in Hotel Operations 2
H Adm 311, Union-Management Relations in Private Industry 3
H Adm 313, Training for the Hospitality Industry 3
H Adm 414, Organizational Behavior and Small-Group Processes 3
H Adm 416, Special Studies in the Management of Human Resources 3
H Adm 511, Seminar in Current Labor Relations Problems in the Private Sector 2
H Adm 512, Managing Organizational Change and Productivity 2
H Adm 513, Situational Leadership and Organizational Behavior X
H Adm 610, Undergraduate Independent Study—Human Resources Management V
H Adm 710, Graduate Independent Research—Human Resources Management V

Financial Management
H Adm 321, Hospitality Management Contracts 1
H Adm 322, Investment Management 3
H Adm 323, Real-Estate Finance 3
H Adm 326, Corporate Finance 3
H Adm 328, Cost Accounting 3
H Adm 329, Financial Decision Support Systems 3
H Adm 421, Internal Control in Hotels 2
H Adm 422, Taxation and Management Decisions 2
H Adm 620, Undergraduate Independent Study—Financial Management V
H Adm 720, Graduate Independent Research—Financial Management V
H Adm 724, Analysis and Interpretation of Financial Statements 3
H Adm 729.1, Hospitality Investments and Portfolio 3
H Adm 729.2, Financial Decision Support Systems 3

Food and Beverage Management
H Adm 336, Principles of Nutrition 3
H Adm 337, The Composition and Properties of Food 4
H Adm 430, Introduction to Wine and Spirits 2
H Adm 431, Seminar in Independent Restaurant Operations Management 3
H Adm 433, Food-service Management in Business, Industry, and Health Care Facilities 3
H Adm 434, Dessert Merchandising 3
H Adm 435, Selection, Procurement, and Supply Management 3
H Adm 436, Beverage Management 2
H Adm 437, Cultural Cuisines 3
H Adm 536, Nutrition and Fitness in the Resort, Hotel, and Spa Industry 3
H Adm 630, Undergraduate Independent Study—Food and Beverage Management V
H Adm 730, Graduate Independent Research—Food and Beverage Management V

Marketing and Tourism
H Adm 244, Tourism I 3
H Adm 441, Advertising Strategies 3
H Adm 444, Tourism II 3
H Adm 449, International Marketing in the Hospitality Industry 3
H Adm 541, Marketing Communications Strategy 3
H Adm 543, Marketing Research 3
H Adm 640, Undergraduate Independent Study—Marketing and Tourism V
H Adm 740, Graduate Independent Research—Marketing and Tourism V
H Adm 742, Strategic Marketing Planning in the Hospitality Industry 3

Properties Management
H Adm 256, General Insurance 3
H Adm 350, Personal Real-Estate Investments 3
Graduate Curriculum

Candidates for the Master of Science or Doctor of Philosophy degrees should refer to the admission and degree requirements set forth in the Announcement of the Graduate School. The student's program is developed with the aid and direction of a special committee, chosen by the student from members of the Graduate Faculty. This committee also approves the thesis.

Candidates for the Master of Professional Studies (M.P.S.) degree pursue one of four tracks in their graduate studies. Students whose undergraduate degrees are in areas other than hotel administration follow track I, for which the required two-year program is set forth below.

The curricula for M.P.S. tracks II and III are specifically designed for each student, based on previous experience and career goals. Students who hold Bachelor of Science degrees in hotel administration from an institution other than Cornell qualify for the track II curriculum. A minimum of three residence units and 48 credits is required to complete track II. Track II students must take 12 credits in a concentration, 6 credits of monograph, 16 elective credits, and any required courses not yet completed prior to their arrival.

Track III is for students who hold a Bachelor of Science degree in hotel administration from Cornell. Two residence units and 32 credits are required to complete track III. Track III students must take 12 credits in a concentration, 6 credits of monograph, and 14 elective credits.

Track IV is for students who hold a master's degree and have no prior degrees in hotel administration. Three residence units and a minimum of 48 credits are required if no required courses are exempted. Track IV students must take 12 credits in a concentration, 6 credits of monograph, prerequisites, and any required courses not yet completed.

All students are required to designate an area of concentration before their next-to-last term. Each student also writes an investigative report or monograph, under the guidance of an adviser, to meet requirements for the M.P.S. degree.

Required Program for M.P.S. Track I

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>H Adm 715, Business Policy</td>
<td>3</td>
</tr>
<tr>
<td>H Adm 716, Advanced Human-Resources Management</td>
<td>3</td>
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<tr>
<td>H Adm 725, Graduate Managerial Accounting in the Hospitality Industry</td>
<td>3</td>
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<td>H Adm 726, Graduate Corporate Finance</td>
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<td>H Adm 731, Graduate Food and Beverage Management</td>
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<tr>
<td>H Adm 732, Graduate Operational Food-Production Systems</td>
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<td>H Adm 741, Marketing Management</td>
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<td>H Adm 751, Project Development and Construction</td>
<td>3</td>
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<td>H Adm 774, Computers and Hotel Computing Applications</td>
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<td>H Adm 791, Quantitative Methods</td>
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<td>H Adm 805, M. P. S. Monograph 1</td>
<td>3</td>
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<td>H Adm 806, M. P. S. Monograph 2</td>
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<tr>
<td>Specifically required credits</td>
<td>36</td>
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<tr>
<td>Concentration credits</td>
<td>12</td>
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<tr>
<td>Free elective credits</td>
<td>16</td>
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<tr>
<td>Total credits required for M.P.S. Track I students</td>
<td>64</td>
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Directied Study

Independent Research

Students may conduct independent research (directed study) projects in an academic area of the school under the direction of a faculty member. Credit is arranged on an individual basis. Only the first 3 credits of directed study may be credited against concentration credits and free electives during the undergraduate years. Additional directed study is credited against free electives, with the exception of the management-intern program (see below). To enroll in an independent research project, students must obtain written permission from the school before course registration.

Management-Intern Program

This program is open only to upperclass and graduate students. Students accepted into the program earn 12 credits, which can be applied against the concentration requirement (hotel electives) or as free electives. Students enrolled in this program have an opportunity to combine managerial instruction with on-the-job management experience. Application for admission should be made one semester in advance. Instruction is provided by the school's faculty and by the organizations participating in the program. Management-intern positions are available at several locations worldwide, including several on the University campus. Students receive both academic credit and practice credit, and appropriate financial remuneration for the period of the program. The student is charged reduced tuition.

Study Abroad

Programs providing an opportunity to study in a foreign country and develop an awareness of the international component of the hospitality industry can contribute to each student's total educational experience. Students in recent years have studied in Italy, Spain, France, and England. Information on the many study abroad programs operating during the summer and academic year is available at the University Career Center. Students should discuss their plans with the school's study-abroad representative so that all petition and credit evaluation procedures are followed.

Current Course Information

Because of the ongoing renovation program in Statler Hall, the building's facilities, including classrooms and laboratories, will not be available until August 1988. As a result, classes and labs must be scheduled outside Statler Hall, in buildings usually reserved by other divisions of the university. In many cases these scheduling arrangements could not be made prior to publication of this book. Students are reminded that the most-accurate, up-to-date information regarding course schedules and descriptions may be found in the supplement issued for that semester by the school's registrar.

Organization Management Courses

102 Distinguished Management Lectures

Fall

1 credit. Limited to School of Hotel Administration students except by written permission. Hotel elective. F 1:25. Dean J. J. Clark.

A series of lectures given by nonresident speakers prominent in the hotel, restaurant, and allied fields. Topics include career ladders, company profiles, and business-policy formulation.
203 Principles of Management  Fall. 3 credits.  
Required.  
Faculty.  
A basic course designed to examine the functions and principles of management, alternative forms of business and organizational structures and relationships, organizational environments, and organizational purposes, policies, and practices. Students will often find themselves working in a team format.

204 Hospitality-Management Seminar  Fall. 1 credit. Limited to 20 seniors and graduate students. Hotel elective.  
Dean J. J. Clark and guest speakers.  
A weekly meeting with the H Adm 102 speaker of the day. The subject matter will, therefore, vary from week to week, depending on the area of expertise of the speaker. Students will be expected to ask questions and enter into discussion, since the class will be relatively unstructured.

205 Club Management  Fall, weeks only. 2 credits.  
Hotel elective.  
Faculty.  
The private-membership club and how it differs from other forms of business in the hospitality industry. Topics include constitution and bylaws issues, administration and interface with board of directors and committees, recreation management, labor-management, and marketing of major tournaments.

207 Human-Resources Management Courses  

303 Organizational Processes and Design  Fall or spring. 3 credits.  
Required.  
B. Lundberg.  
A lecture course in the operation of resort hotels and condominiums. Resorts of various types, seasons, and economic levels are considered. Emphasis is on the promotion of business, the provision of facilities, services, and guest entertainment. Contract and noncontract relationships with the travel industry are reviewed. Terminology, rental-pool agreements, S.E.C. regulations, state statutory requirements, developer-management-owner contracts, and relationships in condominiums are reviewed. Tax implications of both condominium ownership and management are fully considered.

304 Rooms-Division Management—Front Office and Reservations  Fall. Second 7 weeks only. 2 credits. Hotel elective. Estimated cost of required field trip to Washington, D.C., $100.

S. Weisz and visiting lecturers.

An introductory course concentrating on the fundamentals of rooms-division management. Areas of concentration include front-desk operations, reservations, housekeeping, and telephone departments. Particular emphasis on selling strategies, forecasting, rate efficiencies, labor management, and guest relations.

401 Seminar in Management Principles  On demand (see the registrar at the hotel school). 2 credits. Limited to 20 seniors and graduate students. Hotel elective.  
Faculty.  
This course uses the case-study approach, and each student prepares a comprehensive analytical report, based on previous work, for class discussion and analysis. Sufficient time is given during the first few weeks of the course to review management principles and concepts and thus give the student an understanding of the type of report he or she is to prepare and of the analysis required during the discussion period.

402 Hospitality-Management Seminar  Fall. 1 credit. Limited to 20 seniors and graduate students. Hotel elective.  
Dean J. J. Clark and guest speakers.

A weekly meeting with the H Adm 102 speaker of the day. The subject matter will, therefore, vary from week to week, depending on the area of expertise of the speaker. Students will be expected to ask questions and enter into discussion, since the class will be relatively unstructured.

404 Management Organization of the Small Business  Fall or spring. 3 credits. Limited to 20 juniors, seniors, and graduate students, with written permission of instructor. Prerequisite: H Adm 222, 226, or equivalent. Hotel elective. Approximately 40% field trips, $50.  
P. Rainford.

The course focuses on the entrepreneur and the decisions made in planning, financing, developing, and operating a new business venture. Case studies and guest speakers will be used. There will be one major term project, which will require the application of the course material to a field consulting project that will result in a written and oral report to the owner of the business and the Small Business Administration.

406 Integrated Studies in the Hospitality Industry  Fall or spring. 3 credits. Limited to 18 seniors and graduate students. Hotel elective.  
R. M. Chase.

Analysis of case studies involving issues of business strategy, human relations, administration, marketing, and finance. Students will apply course principles through participation in a restaurant-management simulation exercise. Student groups will make presentations to guest critics.

407 Seminar in Hotel Operations  Spring. 2 credits. Limited to 30 students. Hotel elective. Estimated cost of field trip, $100.  
Faculty.  
Management theory and practice of hotel operations.

How to inquire carefully into real hotel situations will be a major focus of this course. Students will be actively involved in writing and discussing cases on current operations issues.

408 Casino Management  Fall. 2 credits. Limited to 50 School of Hotel Administration seniors and graduate students. Hotel elective. Estimated cost of field trip, $100.  
Faculty.  
The objective of this course is to provide the student with an understanding of the management responsibility of casino operations and of the operational differences between, and management philosophies of, casino and noncasino hotels. Overview and analysis of casino administration, with emphasis on relationships and responsibilities of hotel general manager and the casino manager, marketing and junkets, physical layouts, licensing, government regulation, personnel and training, internal controls, and security systems. Includes field trip to Bally’s Park Place Casino hotel in Atlantic City.

501 Creative Management for Innovation  Fall. 3 credits. Limited to 21 students. Hotel Elective.  
F. Berger.

Through lectures, exercises, and a group problem-solving session, participants will analyze the characteristics of creative people and organizations, obtain an inventory of their own creative abilities, examine blocks to creativity and ways to overcome them, discuss methods for leading creative problem-solving sessions, analyze strategies for producing organizational change, and apply creativity techniques to actual work problems.

502 Airline Management  Spring. 3 credits. Hotel elective.  
M. Noden.

The operating environment of both the domestic and international airline industries. Historic and current corporate cultures will be examined, and both pre- and postregulatory climates will be explored. Issues of control, financing, scheduling, competition, and pricing methodologies will be examined. Guest lecturers will provide additional insights into the dynamics of airline management.

601 Management Intern Program I—Operations  Fall, spring, or summer. 6 credits. Must be taken in conjunction with H Adm 602. Independent research.

602 Management Intern Program II—Academic  Fall, spring, or summer. 6 credits. Must be taken in conjunction with H Adm 601. Independent research.

603 Hotel Ezra Cornell  Fall or spring. Variable credit (maximum, 3). Prerequisite: written permission.  
H. Ke.

Elected board members of Hotel Ezra Cornell may receive credit for developing, organizing, and managing the April “hotel-for a weekend.” Independent research.

701 Graduate Seminar in Hotel Operations  Fall. 2 credits. Limited to 30 graduate students. Hotel elective. Estimated cost of field trip, $100.  
Faculty.  
Intended to provide a working knowledge of the terminology, concepts, and procedures utilized by hotel management in developing information and making decisions relevant to the hotel operation. The course is intended to complement courses currently offered. The class will be relatively unstructured.

705 Business Policy  Fall or spring. 3 credits.  
M.P.S. requirement.  
T. Fuller.

The integration and application of management concepts, theories, and practice to actual business situations. Students build upon and integrate academic and practical experience in the analysis of current problems, strategy formulation, and policy implementation. A generalist managerial perspective is developed.

Human-Resources Management Courses  

211 Management of Human Resources  Fall or spring. 3 credits.  
Required.  
A student-oriented approach to the problems of personnel management, starting with an introduction to the personnel function followed by the selection and placement of personnel, the role of supervision with emphasis on induction, training, communications, performance appraisal, and leadership style; a study of age and salary administration; motivation; and a discussion of union-management relations. Emphasis will be placed on class discussion and business and industry. (There will be two evening seminars. There will be two Saturday morning classes of two hours duration scheduled with special guest speakers.)

212 Human-Relations Skills  Fall or spring. 3 credits.  
Required.  
T. Cullen.

Discussion and practice of human-relations skills necessary for managing people. Topics include
supervising, motivating and communicating with employees, leading effective meetings, conducting creative problem-solving sessions, and time and stress management. Analysis of individual leadership skills and interpersonal and intergroup process skills will be emphasized.

311 Union-Management Relations in Private Industry Fall. 3 credits. Limited to juniors, seniors, graduate students, and those who have received written permission of the instructor. Hotel elective. F. A. Herman. Major areas of study include the development of the trade-union movement in the United States, with emphasis on the history and structure of unions active in all phases of the hospitality industry; federal and state laws governing the bargaining relationship, including the role of the National Labor Relations Board; the collective-bargaining process, including negotiations and contract administration and the critical role of conciliation procedures (such as mediation and arbitration) in keeping industrial peace.

313 Training for the Hospitality Industry Fall. 3 credits. Limited to 24 students. Prerequisite: H Adm 211. Hotel elective. Faculty. Training is a fundamental responsibility of hospitality managers and a primary solution to human-resource management problems. The training function within the hospitality industry will be analyzed, and a training and employee development model will be presented. Related subjects such as learning theories, task analysis, the writing of objectives, training methods, and program evaluation will be covered at both the conceptual and experiential levels. Students will gain experience designing and implementing a training program for a hospitality organization.

414 Organizational Behavior and Small-Group Processes Fall. 3 credits. Limited to 30 hotel juniors, seniors, and graduate students by written permission of the instructor. Hotel elective. R. A. Morano. Applications of organizational behavior principles will be explored through lectures, case studies, and management games and exercises. Students will participate in experiential laboratories aimed at enhancing their effectiveness as members or leaders of groups. Topics that will be studied include leadership, decision making, motivation, power, and organizational change.

416 Special Studies in the Management of Human Resources Fall or spring. 3 credits. Limited to seniors and graduate students, except for those who have received written permission of the instructor. Prerequisite: H Adm 211. Hotel elective. D. Dermody. A totally case-study approach to the problems and challenges of managing people in business organizations. Actual cases are presented by individuals who were involved in the cases. Student (suggested) resolution of the cases will be compared to the resolution that actually took place.

511 Seminar in Current Labor Relations Problems in the Private Sector Fall or spring. 2 credits. Limited to graduate students. Hotel elective. F. Herman. A study of current issues facing labor and management in the private service sector, both unionized and nonunion, with special emphasis on the hospitality industry. For spring 1987 concentration will be on dual pay systems, productivity, grievance machinery, and other major labor relations problems. A reading packet and list will be supplied to students enrolled in the course well in advance of the first class meeting. The course will include a field trip to New York City. Note: One additional credit may be earned by undertaking a directed research project (H Adm 610).

512 Managing Organizational Change and Productivity Spring. 3 credits. Limited to juniors, seniors, and M.P.S. students. Hotel elective. K. Blanchard and faculty. The critical issue facing managers today is how to cope with the endless barrage of socio-technological changes that confront them daily. Effective leaders must be able to plan strategies that will enable environmental changes to be directly assimilated into overall organizational development processes. The course will emphasize managerial techniques to identify changes in the organizational environment and will provide hands-on practice in the design of a productivity improvement program and mechanism for organizational development.

513 Situational Leadership and Organizational Behavior Fall or spring. 2 credits. Limited to juniors, seniors, and M.P.S. students. K. Blanchard and faculty. How managers can successfully accomplish the goals of the organization through the efforts of employees. Emphasis will be on recent theories of motivation, behavior, and leadership, with direct application to the hospitality industry. Students will learn the basics of situational leadership and be able to apply this knowledge to managerial positions.

718 Advanced Human-Resources Management Fall or spring. 3 credits. Limited to 18 graduate students. Prerequisite: Introductory psychology and H Adm 211 or equivalent. M.P.S. requirement. F. Berger. The focus will be on development of human-resource management skills and exploration of the dilemmas and responsibilities of leadership. Students will gain insight into their patterns of management behavior by integrating conceptual material with management games and simulations, interaction analysis, and constructive feedback.

Financial Management Courses

120 Survey of Financial Management Fall or spring. 2 credits. Limited to students outside the School of Hotel Administration. J. Bower. A survey of accounting principles, financial statements, cash forecasting, and cash budgeting, and an introduction to financial analysis. Intended for students who desire a general knowledge of the language of business and finance. May be taken with H Adm 322 to include the investment aspects of financial management.

123 Financial Accounting Principles Fall or spring. 3 credits. Limited to students outside the School of Hotel Administration. D. Raab. An introduction to the basic principles of accounting, involving transaction analysis, flow of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

125 Finance Fall or spring. 3 credits. Limited to students outside the School of Hotel Administration. J. Waslef. An objective study of the financial function in a profit-oriented enterprise. Important concepts include cash flow, the time value of money, and capital budgeting. Emphasis is on the analysis of accounting information, problem solving, and decision making.

225 Financial Accounting Fall. 3 credits. Limited to hotel students. Required. D. H. Ferguson. The basic principles of accounting, including transaction analysis, few of accounting data to the financial statements, and careful consideration of accounting for revenues, expenses, assets, liabilities, and owner's equity.

226 Financial Managerial Spring. 4 credits. Open to hotel school undergraduates only. Required. Limited to 50 students per lab. Prerequisite: H Adm 225 or equivalent. S. A. Carvelle. The course emphasizes a broad understanding of both managerial accounting and finance. The overall objective is to develop skill in using accounting information for managerial planning, control, and evaluation and to learn to incorporate accounting knowledge into a five-year and long-term financial decision making. Topics will include budgeting, current asset management, financing, capital budgeting, cost of capital, and problems in international finance and accounting.

321 Hospitality Management Contracts Spring. 7 weeks only. 1 credit. Hotel elective. J. Eyster and guest lecturers. The negotiation and the administration of hospitality management contracts are discussed with major emphasis on contract concerns of owners and operators, financial assessment of owner and operator returns, development of negotiating strategies, and alternative forms of operating agreements.

322 Investment Management Fall or spring. 3 credits. Limited to juniors, seniors, and graduate students. Hotel elective. A. Arbel. The course covers institutional and analytical aspects of security analysis and investment management: securities markets, sources of investment information, bonds and stocks valuation models, risk-return analysis, behavior of security prices, portfolio analysis, and portfolio management. The course also covers the capital asset pricing model, the generic stock investment strategy, and the screen to profile approach and their practical implications for security analysis and investment management. Computer-based budgeting is discussed and applied in a realistic manner using large data bases and interactive screening computer packages. No previous knowledge of computers is required.

323 Real-Estate Finance Spring. 3 credits. Prerequisite: H Adm 325 or equivalent. Hotel elective. J. Eyster. After defining and describing the environment in which a business organization must design its strategy, an examination will be made of financial-analysis and planning techniques necessary to operate in that environment. Focus is on discussion and case studies involving the following areas of financial management: the tax environment, profit planning and forecasting, budgeting, capital-budgeting techniques, and cost-of-capital determination.

325 Hospitality Financial Management Fall. 3 credits. Required. J. Eyster. The course integrates the areas of financial accounting, managerial accounting, and finance and applies the interpretive and analytical skills of each to hospitality-industry situations. Specific topics include uniform system of accounts, revenue and expense tracking and internal control, accounting systems, ratio and comparative analysis, capital budgeting decision making, equity and debt-financing structures, and operating agreement forms. Students analyze hospitality operations and projects using the above techniques and present their findings in management report form.

326 Corporate Finance Fall. 3 credits. Prerequisite: H Adm 222 or equivalent. Limited to juniors and seniors. Hotel elective (concentration requirement). S. A. Carvelle. In-depth analysis of corporate financial management, including financing alternatives and capital structure decisions, cash management, capital budgeting, decision making, risk analysis, and working-capital management.
placid upon the student’s ability to communicate analytical results through the use of management letters.

726 Graduate Corporate Finance Spring 3 credits. Open to graduate students only. Prerequisite: H Adm 726. Recommended: knowledge of algebraic techniques and elementary statistics (students who have not recently had a statistics course are urged to study review books in mathematics and elementary statistics). Required: M.P. S. course. A. Arb. An introduction to the principles and practices of business finance, including the development of the theory and its applications in real-life projects. Topics include: risk analysis, valuation concepts, capital budgeting, cost of capital, capital structure, dividend policy, long-term financing, financial planning, short- and intermediate-term financial management, and mergers and consolidations. Computer-assisted decision-support models are applied in a realistic manner using interactive packages. The course assumes knowledge of quantitative techniques and basic statistics.

727 Financial Decision-Support Systems Fall 3 credits. Prerequisite: H Adm 726 and permission of instructor. Graduate hotel elective. S. A. Carvelle. The course will integrate computer learning and corporate finance. A number of computer decision-support software packages will be used; each will concentrate on a different area of corporate finance. Students will apply financial decision making to case studies and will be expected to use the decision support system to its fullest extent to solve the problems presented.

421 Internal Control in Hotels Spring 2 credits. Limited to 30 juniors, seniors, graduate students, and others who have received permission of instructor. Prerequisite: H Adm 325 or 725, or equivalent. Hotel elective. A. N. Geller. Discussion of problems encountered in distributing the accounting and clerical work in hotels and restaurants so as to provide a good system of internal control. Study of many actual cases of the failure of internal control and the analysis of the causes of the failure. Practical problems and actual techniques of functioning systems of internal control are examined.

422 Taxation and Management Decisions Fall 2 credits. Limited to 50 juniors, seniors, and graduate students. Hotel elective. A. J. Sciarabba. An introduction to tax advantages and disadvantages of various organizational structures, including corporation, partnerships, and Subchapter S corporations; financial-information reporting to tax authorities and shareholders and how they differ; use of depreciation methods to achieve tax reductions; syndication techniques, and the role tax laws play in promoting private investment and development.

724 Analysis and Interpretation of Financial Statements Fall 3 credits. Open to seniors and M.P.S. students. Prerequisite: written permission of instructor prior to enrollment. Hotel elective. A. N. Geller. The course covers the financial accounting issues that are encountered in reporting the results of operations for corporate enterprises. Accounting principles as well as future extensions will be explored and discussed. Emphasis will be on the components of financial statements, how and why they are reported, and their impact on the overall financial position of the firm and its acceptance in capital markets. The underlying objective of the financial statement expertise will be to analyze the firm as a whole and interpret that analysis. Emphasis will be on both outsiders’ views of the company and decision making through interpretation of the statements.

725 Graduate Managerial Accounting in the Hospitality Industry Fall 3 credits. Required M.P.S. course. A. N. Geller. Hotel and restaurant accounting systems that provide decision-making information to management are reviewed. Methods of operational analysis for hospitality properties are evaluated and utilized to include ratio, comparative, and cost-volume-profit analyses. Other topics include internal control, operational budgeting, and the use of feasibility studies in long-term capital-budging decisions. Stress is

food and beverage management courses

313 Food and Beverage Management Fall or spring 4 credits. Required. Prerequisite: H Adm 135. D. Romm. An introduction to the principles of food and beverage management, beginning with an overview of the industry of food and beverage industry at large. Attention is focused on major industry segments and current trends. The applicability of service management concepts is examined and illustrated to the food and beverage business as given to the components of the food-service delivery system: marketing, menu planning, logistical support, production, service, controls, and quality assurance. Product and systems differentiation in various industry segments are emphasized throughout.

335 Restaurant Management Fall. May be offered spring. 4 credits. Prerequisites: H Adm 135, 235. Required. T. Kelly, R. White, G. Pezzotti. A restaurant-management course in which each student participates as a manager of a fine-dining operation. Lectures cover the general management function of restaurant operations, including such topics as restaurant analysis, the consumer's view of the dining experience, and controlling the environment. Case studies dealing with actual restaurant issues will require the student to draw on the materials learned in previous courses. All aspects of production and service in a fine-dining setting will be demonstrated, and, to a great extent, experienced. The laboratory includes an extensive hands-on managerial experience as well as providing an opportunity for the student to become familiar with the various line positions in the restaurant. As manager the student is required to prepare a complete planning and summary report. Students are required to provide their own French knife, paring knife, cork screw (screwdriver or captain's), and meat thermometer, as well as portions of the service-production uniforms. Approximate cost of utensils and manual, $60.

336 Principles of Nutrition Fall 3 credits. Prerequisites: H Adm 135 and 235, and corequisite 337, or permission of instructor. Hotel elective. M. Tabacchi. Designed especially for students interested in the nutritional aspects of the restaurant industry, particularly health spas and hotels that emphasize nutrition and fitness. The nutrient composition of fresh and processed foods, nutrition handbooks, recommended daily allowances, dietary goals as related to restaurants, nutrition labeling, additives, special diets, fat diets, and weight control are studied. The laboratory seminars are designed to provide creative production of high-quality, nutritious food. The uses of nutrients and nutrient interactions are emphasized. An excellent elective for upperclass and graduate students.

337 The Composition and Properties of Food: Chemical and Microbiological Aspects Fall or spring 4 credits. Prerequisites: H Adm 135 and 235 (may be taken as a corequisite). Hotel elective. Faculty. A study of the chemical and microbial properties of raw and cooked foods used and served in the food-service industry. Lectures cover the chemical properties of carbohydrates, fats, and proteins in relation to food groups. Labs provide the opportunity to study various menu items and to relate food-production techniques to material presented during lectures. Emphasis is placed on development of the student's sensitivity to flavor, texture, aroma, and appearance. The course ends with a study of convenience foods and the additives used to prolong shelf life and improve handling.

430 Introduction to Wine and Spirits Fall or spring 2 credits. S-U grades only. Open to juniors and seniors in the Hotel School and seniors and graduate students in all other colleges. All students must be twenty-one years old. S. A. Mulkoski, C. Muller. The main focus of the course will be on identifying flavor characteristics and the factors that influence flavor. Lectures will be given on tasting techniques, developing a wine cellar, and combining food with wine. Samples from a variety of countries, regions, and vineyards will be evaluated. Preregistered students who do not attend the first class and fail to notify the course secretary of their absence are automatically dropped from the instructors' records. The student must then follow the normal drop procedure in his or her school.
The objectives of this course are to assist the student in developing an understanding of the restaurant industry, their supervisory responsibilities, and management structures, as well as fiscal integrity. Students will become familiar with the industry's concept and market, organization, management, physical structure, staff, front-of-the-house operations, back-of-the-house operations, and the service process. Classes will alternate weekly between field trips and seminar or case presentations. The student can expect to incur expenses over the term of the semester of no more than $250 due to the five required field trips.

This seminar will explore various cuisines in terms of history, lifestyle, and foods peculiar to a culture. Through readings, research, and meal preparation, students will explore various cuisines in depth. The goal of the course is to develop an awareness of a variety of international cuisines, enabling students to make comparisons and draw relationships among food ways of different cultures. Each student will be involved in research reports, oral presentations, and designing and orchestrating the preparation of menus.

This course is designed to teach and apply the skills necessary to manage a commercial kitchen or dining room. The course is designed for students who have a strong interest in food and beverage operations and who may be considering a career as an entrepreneur. Under the supervision of the instructor, and using student-developed case studies, the student will visit and analyze existing independently owned restaurant operations. Analysis will cover, but will not be limited to, the restaurant's concept and market, organization, ownership, management, physical structure, staff, front-of-the-house operations, back-of-the-house operations, and fiscal integrity. Classes will alternate weekly between field trips and seminar or case presentations. The student can expect to incur expenses over the term of the semester of no more than $250 due to the five required field trips.

This course is designed to explore and analyze the food-service management in business, industry, and health-care facilities, such as in office and industrial complexes, airline catering, educational institutions, contract companies, and hospital and extended-care facilities. Characteristics of organizational structures, job descriptions, controls (food, human resources, quality), systems design, specialty equipment, and government regulations will be presented. Course work involves readings, small investigative projects, and class discussion. Short, local site visits and one field trip to a metropolitan area are integral parts of the course. The required field trip will cost approximately $150 per student.

The course includes some case studies, and one or two field trips are essential. Expenses for field trips will not exceed $250.

This course is intended to provide the advanced undergraduate hotel administration student with an overview of the discipline of marketing as it applies to the hospitality industry. The primary aim is to understand how a marketing strategy is developed, especially the interrelationship of company objectives, internal resources, and the external operating environment. A second aim is to show how the specific nature of services affects the development of marketing strategies in the hospitality industry.

An introductory course in the study of tourism. The origins and evolution of contemporary tourism will be carefully examined. Students will be familiarized with the various supply components of the tourism industrial base and their integration on an international scale. The effects of mass-volume tourist demand upon destination development will be explored through the use of selected limited case studies. A series of guest lectures by well-known experts from the travel industry will highlight the economic operations and effects of tourist arrivals in both the public and private sectors. This course is open to all students in the University and will serve as the principal prerequisite for the advanced course.

The development of effective advertising strategies for consumer goods and hospitality services. Lectures will focus on principles drawn from psychology, communication theory, and marketing.

An advanced course in the study of tourism. Emphasis will be placed on the development of the tourism industrial base and development and financing of superstructure and infrastructure. Econometric model development for demand forecasting will be examined and analyzed. Students will be expected to engage in a wide range of discussion and analysis of the effects of tourism on various environments in social and economic terms. Case studies of various tourism-generating areas will be used. Occasional guest lectures will be given by experts in both public and private sectors.

Marketing and Tourism Courses
analysis of media resources, message creation, measurement of effectiveness, and organization, coordination, and evaluation of the promotional program. The course will use text material, case studies, readings, lectures, and key speakers. Upon completion of the course the student should be able to develop, organize, and produce a credible promotion strategy and plan of action.

542 Marketing Communications II Spring
3 credits.
W. H. Kaven.
For course information, see the registrar of the hotel school.

543 Marketing Research Fall or spring. 3 credits. Limited to 35 students. Open to hotel graduate students. Prerequisites: previous marketing course and 3 credits of statistics or H Adm 791. Hotel elective. L. M. Renaghan.
The nature and use of marketing research in the hospitality industry. The emphasis is on the management of the process rather than technical aspects of research methodology. Students will have extensive opportunity to critique methodology, analyze data, present results, and make management recommendations.

741 Marketing Management Fall. 3 credits. Required M.P.S. course.
L. M. Renaghan.
The management of the corporate marketing function, with emphasis on firms in the hospitality industry. The emphasis is on developing the student's organizational, analytical, and decision-making capabilities through involvement in case experiences. No prior marketing knowledge is assumed.

742 Strategic Market Planning in the Hospitality Industry Fall. 3 credits. Hotel elective.
Faculty.
The application of strategic market planning concepts to firms involved in various aspects of the hospitality industry. Topics include the concept of corporate mission, using marketing concepts to establish corporate goals and objectives, techniques of analyzing businesses, turnaround management, and strategy formulation and implementation. These topics will be covered through the use of articles, readings, lectures, outside speakers, and case studies.

Properties Management Courses

255 Facilities Development and Planning Spring.
3 credits. Required.
R. H. Penner.
An introduction to, and management overview, of the problems and opportunities inherent in the development and planning of hospitality facilities. Course components include the project-development sequence; conceptual and space planning; architectural; engineering; and construction criteria; and the interpretation of architectural and consultant drawings. The emphasis is on setting appropriate requirements, understanding industry practice, and implementing decisions within a balanced design, operations, and financial framework.

256 General Insurance Fall. 3 credits. Hotel elective.
K. McNeill.
Designed to provide the student with a comprehensive introduction to the insurance field. The emphasis is on fire insurance, casualty insurance, and multiple-peril policies. Covered are such topics as the law of contracts as it relates to insurance; the fire insurance policy and fire insurance forms; business-interruption, marine; burglary, crime; and liability insurance; rates and rate making; bonds; negligence and torts; compensation; package policies; adjustment of losses; and types of insurers.

350 Personal Real-Estate Investments Fall or spring. 3 credits. Limited to juniors, seniors, and graduate students from outside the School of Hotel Administration. Available to hotel students as a free elective.
D. Sher.
The course covers the advantages and disadvantages of investing in real estate and how to maximize gain and minimize risk and possible loss. Topics include the economics of real estate, tax shelters, and financial leverage; types of personal real-estate investments; risk analysis, cash flow, and return on investment, sources of financing, joint ventures and syndications; and acquisition and development of real estate. Recitation sessions will deal with the methodology and calculations of real-estate analyses.

353 Introductory Food-Service Facilities Design Spring.
3 credits. Limited to 15 students. Prerequisites: H Adm 252 or 458, 331 or 335, or equivalent, and written permission of instructor before course registration. Hotel elective. M. H. Redlin.
A course designed to familiarize the student with the basic concepts of food-service facilities design and planning. Students will learn to determine space allocation for kitchen, storage, waste disposal, and service areas. Development of basic production work flow in the preparation and service areas is emphasized. The basic requirements for the selection of equipment using industry standards for production capability, quality of construction, and ease of maintenance are covered. The students will use laboratory time for the planning, design, and specification writing for a small- to medium-size restaurant kitchen.

[354 Advanced Food-Service Facilities Planning and Design Spring. 3 credits. Prerequisite: H Adm 353 or equivalent. Hotel elective. Not offered 1987–88.]
D. M. Stipanuk.
The construction process, including project management, scheduling, contracts, materials, methods of installation, and cost considerations. An overview of building mechanical and electrical systems selection, installation, and operation. The responsibilities of the engineering-maintenance department.

355 Hospitality Facilities Construction and Operation Fall. 3 credits. Required.
D. M. Stipanuk.
The construction process, including project management, scheduling, contracts, materials, methods of installation, and cost considerations. An overview of building mechanical and electrical systems selection, installation, and operation. The responsibilities of the engineering-maintenance department.

358 Hospitality-Industry Real Estate Spring.
3 credits. Prerequisites: H Adm 236, micro- and macroeconomics, or equivalent, or written permission of instructor. Hotel elective.
D. Sher.
Real estate as a capital investment in the hospitality industry and related industries. Lectures will cover the role and importance of real estate in the retail environment, the relationship of real estate to the marketing strategy of a company and its investment decisions; the marketing and merchandising of real estate; the financing of real estate, and the effects of existing real-estate financing on a company's overall corporate financial structure and on its ability to raise funds for future expansion. A field trip and case studies will deal with the application of these topics in existing situations.

452 Hotel Planning and Interior Design Spring.
3 credits. Limited to 12 juniors, seniors, and graduate students.
Prerequisite: H Adm 252 or 458. Hotel elective. Minimum cost of required field trip, $300. R. H. Penner.
A project course concerned with hotel and restaurant planning, interior design, and renovation. Students will establish the operator's criteria for the design of hotel

543 Energy Management Fall. weeks 1–10. 2 credits. Prerequisite: H Adm 356 or permission of instructor. Hotel elective.
D. M. Stipanuk.
Energy audits, management of energy programs, cost-reduction methods, financing and economies of energy management, case studies of commercial building energy management programs.

455 Seminar in Restaurant Planning Fall. 3 credits. Limited to 12 students. Prerequisite: H Adm 357 or 751. Hotel elective.
R. A. Compton.
Development, design, engineering, and construction of restaurants. Topics include market analysis, site selection, menu development, space allocation, trade practices, regulations, equipment and furnishings, cost estimates, financial analysis, and management responsibilities.

456 Property Operations and Maintenance Spring. 2 credits. Concentration requirement.
D. M. Stipanuk.
Management of the physical plant of commercial buildings. Basic building systems, design and operation. Physical plant maintenance, planning, and budget development.

457 Advanced Development and Construction Spring. 2 credits. Concentration requirement.
R. A. Compton.
Advanced treatment of the development and construction process, including the roles of the developer, owner, operator, architect, and engineer, and construction methods, project management, inspection, change orders, and pre-opening activities.

458 Hospitality Facilities Design and Analysis Fall. 3 credits. Prerequisite: H Adm 255 or 751 or permission of instructor. Concentration requirement.
R. H. Penner.
A lecture-studio course dealing with property development, planning, and design by focusing on the interpretation and analysis of restaurant and hotel plans. Students learn basic graphics techniques and apply them to planning problems for hospitality facilities. The course features one-day field trips to nearby hotels and restaurants, some under construction, and includes a final project dealing with the design of a major lodging or restaurant facility.

459 Seminar in Properties Management Fall.
1 credit. Concentration requirement.
D. M. Stipanuk.
A course in which faculty graduate students, and invited speakers present and discuss issues in facilities design, development, and operation.

553 Risk Management Spring. 2 credits. Prerequisite: H Adm 252 or 255 or permission of instructor. Hotel elective. Class meets for ten weeks starting the second week of the semester.
R. H. Penner.
Issues of risk management as applied to life safety, security, and disaster preparedness. Life safety concerns include fire protection, workplace safety, and right-to-know requirements. Security concerns include both property and personal security. Product tampering and liability concerns will be addressed in the context of risk-management activities directed at disaster preparedness. Hospitality-industry applications are stressed.

554 Mixed-Use Development Fall. 2 credits. Limited to 75 seniors and graduate students.
Prerequisites: a course in finance, real estate, or development or comparable work background. Hotel elective. Anticipated cost of field trip, $325. Class begins Monday, September 7.
D. Sher and guests.


Communication Courses

161 Keyboarding for Managers on the Macintosh Fall, spring, or summer. 2 credits. Limited to 25 students per section. Hotel elective.

B. B. David.

An introduction to the Macintosh computer and a beginning course in alphanumeric and numeric keyboarding. Students will learn word-processing skills during the second half of the course.

165 Introduction to Writing for Business Fall or spring. 3 credits. Each section limited to 20 students. Required. Please note: Because of the class-size limitation, a student who chooses to drop this course should notify the instructor no later than the end of the first week of class so another student can fill the opening. Must be completed in the freshman year.


The principles and skills of exposition and argument as they are applied in business contexts. The course emphasizes that a writer must examine purpose and audience carefully; select rhetorical strategies in keeping with that examination; analyze the subject thoroughly; organize ideas clearly; reason logically; marshal appropriate and sufficient evidence; and develop a writing style that is clear, precise, and concise. Students are encouraged to view writing as a multistage process that they can control in order to produce effective business prose.

266 Intermediate French: Le Français de l'Hôtellerie (see also French 123S) Spring. 3 credits. Limited to 12 students in each recitation section. Prerequisites: French 123 or equivalent or written permission of instructor. Hotel elective.

A. Levy.

This course offers continuing study of the French language, in the context of business affairs, with specific emphasis on the hospitality industry. Presentation of material will consider cultural, geographic, economic, historical, political, and social conditions within which business functions. The course will be conducted in French, emphasizing a conversational approach. Specialized situations and vocabulary will be used in building general competence in practical usage. Students with good spoken skills and a special interest in the hospitality industry will be given priority for admission to the course.

267 Intermediate Spanish: Español de Hotelería (also Spanish 123S) Spring. 3 credits. Prerequisites: Spanish 123 or equivalent (CPT score of 560 or above) and permission of instructor. Limited to 12 students. Hotel elective.

E. Dozier.

An intermediate-level Spanish course with emphasis on vocabulary related to the hospitality industry. Oral practice will take place in specific context dialogues and by presentations on cultural, geographic, historic, economic, political, and touristic characteristics of Latin American countries and Spain. The written part of the course will consist of forming a file of correspondence related to diverse aspects of the industry. Students with a special interest in the hospitality industry will be given priority for admission to the course.

364 Advanced Business Writing Fall or spring. 2 credits. Limited to 14 juniors, seniors, and graduate students. Prerequisite: junior, senior, or graduate standing, or written permission of instructor. Hotel elective.

D. G. Flash.

This course focuses on the written communications that demand special persuasiveness and control of tone. Some examples of the kinds of communications that are analyzed, evaluated, and written are negative messages such as refusals, rejections, and responses to complaints; persuasive administrative messages to both subordinates and superiors in an organization, and sales letters and other promotion materials. One major topic is how to plan and execute a job-hunting campaign, both before college graduation and later in one's career. Students prepare résumés, letters of application, and other materials, and propose messages adapted to their individual needs. Conferences will be held to discuss these and other writing assignments. The writing assignments will give students a chance to apply the theories of communication, semantics, and human relations covered in the reading assignments and in class discussions.

561 Organizational Communication for Managers Spring. 3 credits. Limited to 15 graduate students; recommended for second- or third-semester M.P.S. students. Hotel elective.

D. Jameson.

A course in organizational communication focusing on the complex interactions that occur when people communicate in organizations. Students learn to use specific software applications programs to solve original problems. All work is carried out on a Macintosh computer. The knowledge and skills that are developed have wide applications in a variety of business situations.

765 Effective Oral Communication in Organizations Fall, weeks 1-7. 1 credit. Limited to 20 graduate students. Hotel elective.

F. Herman.

This course will concentrate on helping students in three areas: (1) making extemporaneous presentations on business topics with effective presentation design and delivery techniques; (2) selecting appropriate audiovisual support and using it effectively; (3) learning how to listen and run productive meetings. Video camera and tapes will be used in the classroom throughout the period. Individual conferences will be held at the beginning and end of the course.

MIS/Computers Courses

170 Macintosh Tools Spring. 3 credits. Limited to 25 students; open only to students outside the hotel school.

B. David and faculty.

An introduction to business information systems and computer tools. Students learn basic business computing concepts such as system integrity and the user interface. Finally, the course introduces the student to the personal computer, using electronic spreadsheet, graphics, and word-processing applications. Work is carried out on a Macintosh computer using Microsoft Word and Microsoft Excel.

174 Information Systems Fall. 3 credits. Required.

R. G. Moore.

An introduction to business information systems and computer tools. Students learn basic computing concepts such as system integrity, the user interface, and problem definition. File processing and databases are introduced to provide an understanding of computing as it applies to the hospitality industry. Finally, the course introduces electronic spreadsheet, graphics, and word-processing applications. All work is carried out on a Macintosh computer.

274 Hotel Computing Applications Fall or spring. 3 credits. Prerequisite: H Adm 124 or equivalent. Hotel elective.

R. G. Moore.

The course exposes students to concepts of data-base management and management information systems as they relate to computing technology in the hospitality industry. Specific areas covered are hotel systems, reservation systems, communications, and food and beverage systems. Laboratories will provide actual experience with computer-based systems.

374 End-User Business Computing Tools Fall or spring. 3 credits. Prerequisite: H Adm 124 or equivalent. Hotel elective.

R. Alvarez.

For students who may become involved with the analysis and design of computer-based information systems (CBIS). The course is intended to develop competence and confidence in the participants' ability to plan for CBIS, specify their functional design, manage a systems adoption project, deal with system vendors, and function as organizational consultants on CBIS. The course assumes an elementary working knowledge of 8085 and basic business. The course is pragmatic and requires participant teams to analyze and design (and possibly build and test) a software application system.

747 Computers and Hotel Computing Applications Fall or spring. Not offered fall 1987. 3 credits. Limited to 30 students. Required M.P.S. course.

R. G. Moore.

The first segment of the course is devoted to learning computer concepts and elementary programming. During the second semester, the introduction of the computing machine/information system to the hospitality industry is examined from several viewpoints: data base design, management information system concepts, and actual system application.
Other Management Support Courses


791 Graduate Quantitative Methods Spring. 3 credits. M.P.S. requirement. Faculty. An introduction to management science models and statistical techniques applicable to the hospitality industry. The application of specific quantitative methods to decision making in the hospitality industry. Topics include forecasting, decision analysis, linear programming, probability, and queuing. Computer software packages will be used to facilitate the decision-making process.

Independent Research Courses

600–690 Undergraduate Independent Study Fall or spring. Variable credit. Prerequisite: written permission. Hotel elective. Only the first three credits of directed study may count as hotel electives during the student's undergraduate academic career. Additional directed study, if taken, is applied toward free electives, except for the management-intern program of 12 credits. Permission in writing is required before course enrollment. Students should obtain permission form from the school registrar. 345 Sage Hall. (Occasionally an independent research project can be added after the three-week deadline with support of the faculty sponsor and by formal petition.) Faculty. Students pursue independent research projects under the direction of a faculty member.

600 Organization Management

601 Management Intern Program I—Operations 6 credits.

602 Management Intern Program II—Academic 6 credits.

603 Hotel Ezra Cornell

610 Human-Resources Management

620 Financial Management

630 Food and Beverage Management

640 Marketing and Tourism

650 Properties Management

660 Communication

670 MIS/Computers

680 Law

690 Other

700–900 Graduate Independent Research Fall or spring. Variable credit. Limited to graduate students. Prerequisite: written permission of instructor. Students should obtain permission form from the school’s graduate office. Faculty. As appropriate, graduate students enroll in this course for thesis or monograph research or for other independent directed study. The student must have in mind a project and obtain agreement from an individual faculty member to oversee and direct the study.

700 Organization Management

710 Human-Resources Management

720 Financial Management

730 Food and Beverage Management

740 Marketing and Tourism

750 Properties Management

760 Communication

770 MIS/Computers

780 Law

790 Other

802 Master of Science Thesis Research

803 Graduate Teaching Internship

805 M.P.S. Monograph I

806 M.P.S. Monograph II

900 Doctoral Thesis Research

Faculty Roster

Professors


Degan, Melissa, A.O.S., Teaching Support Specialist
Farber, Bonnie M., M.P.S., Lecturer
Flash, Dora G., A.B., Senior Lecturer
Huettman, Elizabeth, M.A., Visiting Lecturer
Kaler, Howard, B.S., Lecturer
Lumley, Jane, M.A., Senior Lecturer
McNeill, Keith, B.S., Lecturer
Morano, Richard A., D.Ed., Visiting Lecturer
Muller, Christopher C., M.P.S., Teaching Support Specialist
Neuhaus, Thomas W., M.S., Lecturer
Noden, Malcolm A., Senior Lecturer
Norkus, Gregory X., M.S., Lecturer
O'Conner, Therese A., M.S., Lecturer
Panariès, Peter, LL.B., Visiting Assoc. Prof.
Pezzotti, Giuseppe G. B., B.S., Teaching Support Specialist
Richmond, Bonnie S., M.S., Lecturer
Sciarabba, Andrew, B.B.A., Visiting Lecturer
Sher, David, M.S., Senior Lecturer
Spies, Rupert, Studienassessor (a.D.), Teaching Support Specialist
Weisz, Stephen, B.S., Visiting Lecturer
White, Robert, A.O.S., Teaching Support Specialist
Whitehead, Donald E., B.S., Visiting Lecturer
Yesawich, Peter C., Ph.D., Visiting Assoc. Prof.
Division of Student Services

V. Utermohlen, assistant dean for educational programs and policy
B. Bricker, director of admissions
W. Graham, director of institutional studies
J. McAllister, college registrar
L. Wiley, director of student services

Persons interested in undergraduate study in human ecology should contact the Office of Admissions, 172 Van Rensselaer Hall. Those interested in graduate study should contact the graduate field representative identified among the faculty of each department. Department faculty are listed on subsequent pages at the beginning of the course descriptions for each department.

Matriculated students can find assistance with matters of academic credit and graduation requirements in the Office of the College Registrar, 146 Van Rensselaer Hall. Assistance with academic advising, career planning and placement, and personal counseling may be obtained from the Office of Student Services, N101 Martha Van Rensselaer Hall.

The Students

The College of Human Ecology undergraduate enrollment is 1,220, with 54 percent in the upper division. About 300 students are graduated each year, and last year 274 freshmen and 161 transfer students matriculated. One hundred faculty members serve as advisors for undergraduates. About 175 graduate students have members of the college's faculty chairing their special committees.

The college admissions committee selects applicants who are academically well prepared and appear most likely to profit from the college's various curricula. About forty master's degrees and twenty-five doctorates are awarded each year. Admission is selective. Three out of four freshmen were in the top 10 percent of their high school graduating classes. Mean Scholastic Aptitude Test (SAT) scores for freshmen accepted in fall 1986 were 582 verbal and 639 mathematics.

Approximately 75 percent of the student body comes from New York State, with the remainder from other parts of the United States and abroad. Sixteen percent were identified as members of minority or ethnic groups in 1986.

Academic Programs

Majors

Each department offers a major, and within most departmental majors there are specific options. The college also offers two interdepartmental majors. Selecting a major means choosing one option in one department. Although a student may satisfy the requirements of more than one major option, he or she is officially certified to graduate under only one. (The college urges students who satisfy more than one major option to make note of this in the credentials they file through adolescent development; atypical development; design facility planning and management, human- -economics, and housing.

Design and Environmental Analysis (DEA): consumer economics, and housing.

Human Development and Family Studies (HDFS): does not have separate options. Courses focus on cognitive, personality, and social development; infant through adolescent development; atypical development; and family studies.

Human Service Studies (HSS): does not have separate options. Courses focus on human-service environments, programs, and processes. A professional internship and senior seminar are required. Students may meet the requirements of an accredited bachelor's program in social work.

NUTRITIONAL SCIENCES: experimental and consumer food studies, nutrition, nutritional biochemistry, clinical nutrition, community nutrition. (By careful planning, students may also meet the minimum academic requirements of the American Dietetic Association.)

Textiles and Apparel (TXA): apparel design, apparel-management, textile science.

Interdepartmental Major in Biology and Society (ID-BS).

Interdepartmental Major in Policy Analysis.

Individual Curriculum: It is possible to develop an individual program of study if none of the above programs fits particular educational and career objectives.

Changing Majors

Because any student's interests and goals may change as new options emerge, the college provides ways for students to change their majors. When a declared major no longer seems to meet a student's educational goals, a counselor or faculty adviser may be able to point out alternatives. If the student decides to make a change, a change-of-major form (available from the Office of the College Registrar, 146 Van Rensselaer Hall) ensures that the change is sent to the department in which the student wishes to major, so an adviser can be assigned to the student.

Students of Mature Status

The college recognizes that students who interrupted their formal education and are returning to school have needs different from those of the average undergraduate. To facilitate the education of mature students, defined as those twenty-four years old or older at matriculation, the college has adopted certain procedures specifically for that group. Mature students are permitted to enroll for as few as 6 credits without petitioning and are also permitted to extend their residency beyond the normal eight terms. It is highly recommended that mature students contact Valerie Seliers, the director of the Continuing Education Information Center, B12 Ives Hall, for information on services available through that office.

Special Students

Students eligible for special status are those visiting from other institutions and interested in particular programs in the college; those with a bachelor's degree preparing for graduate study or jobs and careers in human ecology-related fields; or those who have interrupted their education and are considering completing degree programs. Students accepted in the non-degree status of special student may enroll for a maximum of two semesters. During the second semester of attendance, a special student must either apply for admission as a transfer or plan to terminate studies in the college at the end of the semester. Special students are expected to take a minimum of 12 credits each semester and to take one-half to two-thirds of their work in the state divisions of the university. Work taken while a person is classified as a special student may be counted toward the requirements of the bachelor's degree.

Empire State Students

Occasionally a student who is completing requirements for a degree through the Empire State College Program is interested in taking a human ecology course. This can be done by registering through the Division of Summer Session. Extramural Study, and Related Programs, B12 Ives Hall. All rules of the extramural
division apply, and registrations will be accepted only on a space-available basis and with the written approval of the course instructor.

At the time of registration, Empire State College students provide the extramural division with a completed copy of Empire State College's notification of cross-registration form number, SA-22, F-031, to verify enrollment in Empire State College. Such students will be charged 25 percent of the standard extramural tuition per credit.

Consumer Economics and Housing

The behavior of people as consumers and family members and their interactions with the private and public sectors of the economy have become increasingly important as the United States shifts to a service-based economy. One result has been an increasing demand from business and government for trained individuals who understand consumers and families, how they interact with private markets, and how public policies affect those markets, and through them, consumers. The demand has been sufficient to elevate salaries for well-trained individuals.

The consumer economics and housing (CEH) and the interdepartmental policy analysis majors provide such training. The majors combine economics with statistics, sociology, and political science. CEH majors study how consumer markets work, how firms and consumers behave, how marketing plays in protecting consumers; how functions shift between household and marketplace as prices, incomes, social values, and legislation change; and how changes in the family, impact on consumer markets. Students interact with the faculty and with each other both in the classroom and in field-based learning experiences in the Ithaca area, New York City, Washington, and elsewhere. Students can specialize within the major in a number of areas, including consumer affairs and policy, housing, and financial advising.

Graduates in CEH are prepared for a wide variety of consumer-related positions in business and in government. The major also provides an excellent foundation for further studies in economics, law, business administration, and policy analysis.

Design and Environmental Analysis

The Department of Design and Environmental Analysis (DEA) is concerned with planning, designing, and managing interior environments to satisfy human needs. Most people spend over 90 percent of their lives inside buildings. Those settings have substantial and far-reaching effects on the quality of our lives. The processes for creating and maintaining the built environment face enormous challenges. These include frequent social and organizational change, technological advances, new building methods, and finite resources. The program in DEA is dedicated to preparing professionals who can meet these challenges.

Diverse faculty backgrounds and teaching approaches help students to develop their multidisciplinary problem-solving and creative abilities, aesthetic judgment, and analytical skills. Enriched laboratory shop, studio, and computer facilities permit exploration of innovative concepts for the design and management of interior environments. The relationship between people and their physical surroundings is explored through a combination of academic courses, field experience, and applied research. Examples of student class projects and faculty work are frequently on display in the department's gallery. The DEA Resource Center includes books, journals, newsletters, and materials samples for student use.

Academic Advising

All DEA majors are matched with a faculty adviser during their first semester by advising coordinator Michael Boyd, in E410 Martha Van Rensselaer Hall. Consultation with faculty advisers about future goals, departmental requirements, sequences of courses, and electives inside or outside the college to meet special needs leads to more effective educational planning. Students majoring in interior design, especially, must begin early to plan and collect materials for a portfolio of their work, which is necessary for many positions and for application to graduate schools. Faculty advisers can make recommendations on what to include, and students are free to change advisers. Although advisers must sign the green schedule card during course enrollment each term, it is the student's responsibility to keep track of his or her courses and to make sure that the program meets graduation requirements for the major and the college.

Ownership and Exhibition of Student Work

All design work done in studios as part of an academic program is the property of the department until it has been released by the instructor. The department is not responsible for loss or theft of student work.

Options

The department offers undergraduate education in three professional areas: interior design, facility planning and management, and human-environment relations.

To take full advantage of the course sequences and electives, it is important to select an option as early as possible. This is particularly true in the interior design option. Transfer students in the interior design option may need one or two extra semesters to complete the program.

Option I: Interior Design

The interior design option prepares students for professional careers in the planning and design of interior spaces and associated products. The program emphasizes a problem-solving approach based upon knowledge of buildings and their associated systems; furniture and interior products; human-environment relations; and design principles. Some students combine this program with one of the other options.

Careers are available in interior design and space planning, interior architecture, facility planning, interior product design, and housing. This program also serves as an excellent preparation for graduate study in interior design, facility management, architecture, and product design.

Option II: Facility Planning and Management

This option focuses on the planning and management of complex settings such as office buildings, healthcare facilities, research laboratories, and residential complexes. Facility planning and management is a basic management function that coordinates and integrates information and expertise from areas such as space planning and design, real estate, business administration, human factors—ergonomics, environmental psychology, telecommunications, and building operations. Students will gain knowledge in planning and managing facilities that support individual and organizational effectiveness over time.

Excellent career opportunities exist in the facility management divisions of private companies, institutions, and the health-care industry. Opportunities exist for graduate study in business, planning, or one of the design disciplines.

Option III: Human-Environment Relations

Human-environment relations focuses on the interaction between people and their physical surroundings. This option seeks to understand expanding of how the environment affects human perception, cognition, motivation, performance, health, safety, and social behavior. The effect of human capabilities or characteristics such as family structure, life-style, social class, and stage in life cycle on environmental needs and requirements is also a focus of the program.

Human-environment relations is good preparation for graduate study leading to a Ph.D. degree in the social sciences and a career in academic or other research-oriented settings in either the public or private sector. It can also serve as the basis for graduate study in an environmental planning or design discipline such as architecture, facility planning and management, interior design, landscape architecture, or city and regional planning. Electives in the social sciences and in research methods and statistics are encouraged.

Human Development and Family Studies

The programs of the Department of Human Development and Family Studies (HDFS) are concerned with how people develop throughout the life course. Of equal interest is the family as a context for individual development and as a part of the larger structure of society. An ecological perspective—the person in interaction with complex biological, situational, and environmental conditions of everyday life—is featured in many departmental courses.

Major social science disciplines concerned with the development of individuals and with the structure and function of families are represented among faculty members with backgrounds in psychology, sociology, history, and education. The department's programs of instruction, extension, and research provide diverse opportunities for students to prepare for career development or to acquire the bases for graduate study. Many of the department's majors are interested in medicine, law, counseling, clinical psychology, special education, or university teaching and research, which require some graduate study. Others may take bachelor's-level positions as youth counselors, day-care workers, personnel assistants, research technicians, social program assistants, etc. The department does not offer programs leading to teaching certification at any level.

The Curriculum

HDFS majors usually combine a broad liberal education with a more specialized focused or emphasis on a problem of human concern or a substantive area of concentration. Areas of specialization available within HDFS include infant, child, adolescent, and adult development; abnormal development; family, cross-cultural, and social-personality and cognitive development. Some students combine an HDFS major with premedical or prelaw training or with specialized work in an area outside the department, such as communication arts, nutrition, business, or government.

During their first two years, students are expected to combine a variety of liberal arts courses with HDFS core courses HDFS 115 (Human Development: Infancy and Childhood) and HDFS 150 (Families in Modern Society), and two of the following four courses: HDFS 212 (Adolescence and Youth: Biological and Cognitive Development), HDFS 217 (Adolescence and Youth: Personality and Social Development), HDFS 218 (Adulthood and Aging: Personality and Social Development), and HDFS 219 (Adulthood and Aging: Biological and Cognitive Development). This encourages diversity yet ensures a common base for upper-level courses in the major. Course taken in the department vary from lectures and discussions to research and independent study.

All students are encouraged to participate in an experiential learning course in their particular area of interest. The course may be either a naturalistic or laboratory setting (e.g., nursery school, youth detention center, retirement home) or on a research setting (e.g., interviewing, administering tests, observing behavior).
Social Work Program
The undergraduate program in social work at Cornell has three major goals: to prepare students for positions in the field that do not require advanced degrees; to prepare students for graduate education in social work; and to contribute to the enrichment of a general college education by helping students understand social-welfare needs, service, and issues. The social work program is accredited by the Council on Social Work Education. Students who complete all requirements are eligible to apply for advanced standing in a graduate school of social work or for beginning-level employment as professional social workers.

Textiles and Apparel
The Department of Textiles and Apparel (TXA) focuses on the use of textiles and fibrous materials for apparel, durable and nondurable household goods, composites, and biomedical applications. Programs in the department, in keeping with the overall mission of the college, emphasize the needs of individuals, families, and other groups who use textiles and textile products. The curriculum includes the application of design principles, physical and materials science, economics, and marketing, government policy/regulation, and management of products and their delivery. Practical problem-solving skills are developed in the department's laboratories and studios, and academic course work is further enhanced by field experiences. Gallery space provides the setting to display design work. In addition, the Cornell University Costume Collection housed in the department, provides valuable resource; items from the collection are made available to students for classroom and special-study use.

Academic Advising
All TXA majors are matched with a faculty adviser by the advising coordinator, S. Kay Obendorf (206 Martha Van Rensselaer Hall). Students are strongly urged to discuss their goals, course selection, and sequence, and electives with their faculty adviser. Students in apparel design must begin early to work with their advisers to develop a professional portfolio of their work. Students are free to change advisers; changes must be cleared through the advising coordinator. Although advisers must sign the green schedule card during course enrollment each term, it is the student's responsibility to keep track of his or her courses and to make sure that the program meets graduation requirements for the major and the college.

Ownership and Exhibition of Student Work
All apparel design work done as part of the academic program is the property of the department until it has been released by the instructor. Certain exceptional work may be retained by the department to exhibit for academic purposes. The department is not responsible for loss or theft of student work.

Options
Students may select options in apparel design, apparel-textile management, or textile science. Option I: Apparel Design. The study of apparel design includes both functional and aesthetic considerations in the design of body coverings. The program emphasizes a problem-solving approach that enables the student to bring a background in apparel, textiles, and human factors to the design process. Option II: Apparel-Textile Management. Apparel-textile management combines the fields of apparel and textiles with those of economics, business management, and organizational policy. Students combine theory with case studies to find solutions to everyday problems. Course work is offered in many interrelated disciplines, including textiles, apparel, economics, business management, and communication arts, as well as practical field experiences. This provides students with the experience of working with professionals from a wide variety of disciplines. Students often combine this option with either Option I (Apparel Design) or III (Textile Science).

Option III: Textile Science
Applications for textile structures include advanced engineering composites, protective clothing for industrial and military environments, and biomedical materials as well as the manufacture of functional fibers found in apparel and home furnishings. The textile science option provides a strong base in mathematics and the physical sciences combined with supporting courses in engineering, consumer economics, and the social sciences.

Career Opportunities
Graduates of all programs in the Department of Textiles and Apparel have found challenging employment within the textile and apparel sector, in independent and government-sponsored research, and in community organizations. Recent graduates are working in the fields of new product development, design, management, engineering, communications, and marketing. In addition, the program prepares students for graduate or professional study in fiber and polymer science, textile marketing, apparel design, textiles, or business and management.
Policy Analysis
The Department of Consumer Economics and Housing (CEH) supervises students who select the interdepartmental policy analysis major. As all sectors of the economy have become more intertwined, knowledge of the impacts of governmental action upon consumers and families, consumer markets, and business and industry has gained in importance. Individuals with the ability to analyze those impacts and trace their consequences to consumers, families, and business and industry are in demand both at all levels of government and in business. Organized and managed by the CEH department, the policy analysis major utilizes the resources of the college and the rest of the university to build the knowledge and the analytical skills required to trace and estimate government’s influence in the economy.

The policy analysis major gives students a basic understanding of the economic and political roles governments play along with the program—analysis and evaluation skills necessary to comprehend the quantitative and qualitative importance of governmental influence. To talk with students make in-depth studies of two policy areas (e.g., health policy, consumer policy, environmental policy, and foreign policy) of their choice. Because experience in legislative, regulatory, and policy making is very helpful, involvement in field-study, Cornell—in—Washington, and Cornell Abroad programs is encouraged. The specific requirements for the policy analysis major are listed under the interdepartmental majors.

Graduates in policy analysis are attractive to businesses and industries as well as to governmental agencies because of their economics and political science background and their analytical skills. Students also use the major to prepare for further work in policy studies, law, and business administration.

The CEH majors are flexible and allow individual program planning. All students mapping in consumer economics and housing and policy analysis are assigned a faculty adviser by the advising coordinator. The earlier a student decides to major in the department, the greater the opportunity to develop a program that will meet individual educational or career goals. Transfer students are urged to discuss their plans with a faculty adviser as soon as possible. An appointment should be made with an advising coordinator. Peter Chi and Keith Bryant, may be made directly.

Individual Curriculum
A student who has educational and professional objectives that cannot be met satisfactorily within the framework of existing majors in the College of Human Ecology may petition to develop an individual curriculum. To be approved, the curriculum must be within the focus of the college and be interdisciplinary in design, include at least 40 credits in human ecology courses, and not exceed the normal number of credits assigned a faculty adviser by the advising coordinator. An appointment should be made with an advising coordinator. Peter Chi and Keith Bryant, may be made directly.

A student must be aware that if the management course work taken in the senior year is in excess of the 21 additional credits allowed in the Cornell endowed divisions, they will be charged for the additional credits on a per-credit basis.

Human Ecology Field and International Study
Field Study
Field study enables students to learn from participation in a community and organizational setting and from reflection on that experience through discussion, reading, and writing. This process of integrating theory with practice distinguishes field study from work experience and provides the rationale for granting academic credit.
The Human Ecology Field and International Study Office, 159 Martha Van Rensselaer Hall, offers interdepartmental, prefield preparation and field-based courses with an interdisciplinary problem-solving approach to social issues. Field placements are located in the Ithaca area, New York City, Albany, Washington, D.C., Boston, and elsewhere. Courses are open to registration by all Cornell students.

International Study
Study abroad provides students with an opportunity to add an international dimension to their human ecology program through course work focusing on international problems and intercultural understanding and through sponsored programs of study abroad for which credit is available. Course work in a foreign institution will, in general, be planned to increase knowledge of the people and institutions of the country concerned; the work may provide guidance experience in family, community, or agency situations of the world concerned and in an area related to individual student interest in human ecology.

Opportunities for study abroad are available for human ecology students in several ways: through Cornell Abroad, through U.S. college-sponsored programs abroad, and through direct enrollment in a foreign university. In each case, students will remain registered at Cornell during the overseas study, and their study abroad will be credited as part of their Cornell degree program. Applications for study abroad should be submitted to the study-abroad adviser in the Field and International Study Office.

University Programs
African Studies and Research Center
Courses taken in the Africana Studies and Research Center (ASRC) may be used to meet some of the distribution requirements of the college. Up to two courses or 8 credits of such courses may be applied toward the 12 additional credits in natural and social sciences (section I-C of the graduation requirements) or toward the 9 additional credits in communication, analysis, and the humanities (section II-B). This allowance is in addition to the freshman writing seminar credits that may be taken in ASRC. Other courses taken in the center count as endowed division electives.

A list of ASRC courses approved to meet distribution requirements or as electives is available in the Office of Student Services and in the Office of the College Registrar.

Dual-Registration Programs
Johnson Graduate School of Management
A limited number of highly qualified students from Cornell graduate divisions, including human ecology, may be accepted by the Johnson Graduate School of Management after the junior year. Students must meet the admissions office and the registrar in the College of Human Ecology. Accepted students should be aware that if the management course work taken in the senior year is in excess of the 21 additional credits allowed in the Cornell endowed divisions, they will be charged for the additional credits on a per-credit basis.

Law School
A small number of highly qualified applicants may be admitted to the Cornell Law School after only three years of undergraduate education. The requirements for admission under these circumstances are more stringent than for acceptance after four years of undergraduate study. Applicants must present outstanding qualifications and strong professional motivation. The junior-year applicant follows the ordinary application procedures for Cornell Law School admission. Interested students should contact the Law School director of admissions to review the extraordinary admissions criteria. Since students accepted to this program will be spending their senior year in the Cornell Law School, they need to plan ahead to ensure that distribution requirements for the B.S. degree from the College of Human Ecology will be met. Successful applicants need the approval of the college registrar.

Cornell Medical College
A limited number of highly qualified students from three Cornell divisions, including the College of Human Ecology, may be accepted by the Cornell Medical College after the junior year. To be considered for this program, the student must have completed 105 credits toward graduation by the end of the junior year. Students also need to plan ahead to ensure that distribution requirements for the bachelor of science degree will be met. Students may petition to enroll in courses at Ithaca College. Students must be aware that if the management course work taken in the senior year is in excess of the 21 additional credits allowed in the Cornell endowed divisions, they will be charged for the additional credits on a per-credit basis.

Off-Campus Programs
New York State Assembly Internships
A limited number of session internships with the New York State Assembly are available in spring semester to students of sophomore status and above who are enrolled in New York State colleges or universities. Human ecology students apply to the program through the student’s major department. The New York State Assembly also sponsors a summer internship. Further information about internship programs may be obtained through the Field and International Study Office, 170 Martha Van Rensselaer Hall.

Ithaca College
Full-time undergraduate students at Cornell may petition to enroll in courses at Ithaca College. Students pay regular tuition to Cornell and only special fees to Ithaca College, if any are charged. Students are allowed to register for one course a term and may take no more than 12 credits in four years. Exceptions will be granted to Cornell students enrolled in methods-and—practice teaching courses at Ithaca College.

Cornell students are eligible to register only in Ithaca College courses that are relevant to their program and that do not duplicate Cornell courses. Acceptance of
Cornell students into Ithaca College courses is on a space-available basis. Participation in this program is not guaranteed, and Ithaca College has the right to accept or reject students for any reason it deems appropriate. The program is available only during the fall and spring semesters. For further information students should contact the college registrar, 446 Van Rensselaer Hall.

Planning a Program of Study

Academic Advising

When students decide to major in a particular department, they are assigned to a faculty adviser by the advising coordinator in that department. The advising coordinator can help match the student’s needs with the special interests of a faculty member. Students are free to change advisers as their own interests change and should see the advising coordinator to discuss such a change. Faculty advisers and counselors in the Office of Student Services are available to discuss course requirements and sequences, and electives inside or outside the college, as well as future goals and career opportunities.

Although advisers must sign the green schedule card during course registration each term, it is the student’s responsibility to keep track of his or her courses and to make sure that the program meets graduation requirements for the major and the college. Advising coordinators in each department are happy to answer questions about the advising system and the undergraduate major. Students who are exploring alternative majors should work closely with college counselors who are available for planning and referral to departmental resource faculty.

Completing Graduation Requirements

A summary of record is kept for each student in the Office of the College Registrar. At fall registration each continuing student receives a copy showing which major and graduation requirements have already been met. It is important to check this summary and to bring any questions to the attention of staff members in the Office of the College Registrar. Although a student may complete the requirements of more than one major, he or she is officially certified to graduate under only one.

Electives

Students have individual objectives in choosing courses beyond the minimum requirements of the major. The university is diverse; the departments, centers, and special programs numerous; the fields of study almost unlimited. Counselors and department advisers are available to discuss which courses may interest students and round out their educations.

Students should consult the index of this Announcement for information on the subjects and programs of study. Every student is encouraged to consult his or her counselor to make plans to meet the requirements of the major.

Graduation Requirements for the Degree of Bachelor of Science

General

- Students applying as undergraduates who do not have the required academic unit in biology, chemistry or physics are required to show evidence of having met this deficiency before matriculation in the college.
- Freshmen and sophomores are required to enroll in at least one course in the college per semester.

To graduate, students need to:
1. meet college credit and distribution requirements,
2. complete requirements for a major,
3. achieve a cumulative average of 1.7 (C- or better),
4. fulfill residency requirements, and
5. complete two terms of physical education within the first two semesters.

College Requirements

These are the general areas of study and specific courses and credits required of every student in the college. The major you choose may require specific courses listed below or may leave you free to choose among certain courses listed there.

I. Natural and Social Sciences (24 credits)


B. Social sciences (6 credits) selected from economics (including CEH 110, 111 but excluding Agricultural Economics 221 and 310); psychology (including Education 110, 311, 317; DEA 150, HDF 115, 216; 217, 218, 219); sociology (including rural sociology, CEH 148, and HDF 150). Do not take both Economics 101 and CEH 110, Economics 102 and CEH 111; Psychology 101 and Education 110; Rural Sociology 101 and Sociology 101; or Sociology 243 and HDF 150; they are equivalent courses.

C. Additional credits (12 credits) selected from any subjects listed above or from courses in anthropology, anthropology, biology, biochemistry; microbiology, genetics and development; Geological Sciences 101; and government.

II. Communication, Analysis, and the Humanities (15 credits)

A. Freshman writing seminars (6 credits) selected from courses listed in the freshman writing seminar brochure.

B. Additional credits (9 credits) selected from art; communication, comparative literature; computer science; drawing; English; ancient or modern foreign languages; history; history of art; history of architecture; mathematics; music; Natural Resources 407; philosophy; statistics (students should not take both Industrial and Labor Relations 210 and Agricultural Economics 310, since the courses are substantially the same); theatre arts; DEA 101, 111, or 115; HSS 292, and selected ASRC courses (list available in the Counseling Office, N101 Martha Van Rensselaer Hall).

III. Human Ecology (40 credits)

A. Requirements for the major (the number of credits required varies by major and option)

B. Course work in at least two departments outside the major (15 credits), including two courses totaling 6 credits minimum in one department and one 3-credit course in a second department. Not more than 3 credits of the 15 may be in special studies 400, 401, 402, either departmental or interdepartmental (ID). HE 100 cannot be used to fulfill this requirement, nor can an undergraduate teaching assistantship designated "403."

IV. Additional Credits (41 credits)

A. Requirements for the major (number of credits varies from 0 to 15 credits).

B. Electives (number of credits varies from 26 to 41 credits).

Credit requirements in this section are met through courses in the state divisions of Cornell:

- College of Human Ecology (in addition to courses in sections I, II, and III)
- College of Agriculture and Life Sciences
- College of Engineering
- School of Hotel Administration
- Johnson Graduate School of Management

Courses in the endowed divisions in this section may not exceed a total of 21 credits.

V. Physical Education (2 credits)

Students who have successfully fulfilled these requirements should have completed at least two terms of physical education in their freshman year.

Related Policies

College course requirement. Freshmen and sophomores are required to enroll in at least one course in the College of Human Ecology a semester. Students who fail to complete this requirement will be reviewed by the Committee on Academic Status for appropriate action.

Section II. Students who receive credit from the advanced placement examination in English are still held for the freshman writing seminar requirement.

In sections I, II, and III, the required credits listed are the minimums; credits taken in excess of those minimums (section I, 24 credits; section II, 15 credits; and section III, 40 credits) count toward electives (section IV, 41 credits).

In sections I and II, courses specified by the major to meet the requirements in the sections may either be used as meeting the credit requirements in these sections or be applied toward the additional credits in section IV.

Section IV. There is no limit to the number of credits that may be taken in the state divisions of Cornell, and therefore students may choose to take additional state credits and graduate with more than 120 credits.

Credits in the endowed divisions in this section may not exceed 21. Any course taken in an endowed division for which a grade of F or U is received will be counted against the 21 endowed credits allowed.

Elective credits earned in Cornell's endowed divisions during summer session, in absentia credits, and transfer credits are counted as credits earned in the state divisions and therefore not counted against the 21 credits allowed in the endowed divisions in meeting the requirements of this section.
Not more than 21 credits in section IV may be taken in the endowed divisions of the university except under both of the following conditions:

1) The students must have senior status (must be in the final two semesters prior to graduation);
2) Payment must be made for each credit taken in excess of the 21 allowed, whether or not the courses are passed. For the precise fee per credit, students should call the Office of the Bursar.

Related Policies for Transfer Students

Section I-A. Transfers who are entering human ecology programs in consumer economics, housing, human service planning and policy development, policy analysis, or human development and family studies can satisfy the College of Human Ecology’s natural science graduation requirements with any course(s) taken to meet a former college’s natural science requirements as long as the course(s) transferred dealt with matter, energy, and their interrelationships and transformations. Courses in areas such as psychology and mathematics are not included, even though courses in these areas may have been taken to meet a former institution’s natural science requirement.

Section II-A. Transfer students should have taken at least 6 credits in courses in English composition or in courses requiring substantial writing and offering instruction in writing equivalent to that offered in the freshman writing seminar program at Cornell. Students who have not fulfilled this requirement before transferring must fulfill it after matriculation.

Section III-B. Transfer students can meet the requirement for course work outside the major in the College of Human Ecology by completion of:
1) 15 credits of work, outside their department, comprised of transfer credit and credit earned in the college, or
2) credits all taken in this college (no transfer credit is allowed to meet this requirement), on the basis of the status of the student’s matriculation and prorated as follows:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
<th>Status at Matriculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cornell Human Ecology</td>
<td>15</td>
<td>Freshman (1–25 transfer</td>
</tr>
<tr>
<td>Credits to Satisfy Work outside the Major</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sophomore (26–55 transfer credits)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Junior (56–85 transfer credits)</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Senior (86–120 transfer credits)</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

In both options, the courses must be in at least two departments outside the major with two courses comprising 6 credits in one department and at least one 3-credit course in a second department. Note that transfer students are still responsible for completing a total of 40 human ecology credits under section III.

Section IV. Transferred credits for courses applied toward electives do not reduce the 21 Cornell endowed credits that students are allowed. Courses with a passing grade below C — will not transfer for a major requirement or a distribution requirement. Such courses will transfer only as elective credit.

Section V. Transfers students who have had the equivalent of two semesters of college (and therefore enter as sophomores) are not required to take physical education at Cornell, regardless of whether they took physical education at their first college. Exemption or postponement for medical reasons must be cleared by Gannett Health Center. For further information about exemption from, or postponement of, physical education, students should consult the college registrar, Joyce McAllister, in 146 Martha Van Rensselaer Hall.

Related Policies for Freshmen

Section V. Freshmen are required to take two semesters of physical education during their freshman year. Freshman transfer students entering with 12 or more credits have their physical education requirement reduced to one term.

Residency Requirements

All college curricula are planned to fit within an eight-semester program. An average schedule of 15 credits a semester (in addition to physical education) is considered standard, and if pursued for eight semesters will provide the credits needed for graduation. If the student completes all the requirements — for the major, for distribution, for total credits, and for cumulative average — in fewer than eight semesters, the degree may be conferred at the end of the semester in which the last requirements are met. Students who plan to receive their degrees early should notify the registrar at the beginning of the semester so that their names can be placed on the list of degree candidates.

Sometimes a student (particularly a transfer student) may need an additional semester to complete a program. To register for a semester beyond the eighth, the student submits a petition to the college registrar. The petition should detail the reasons for wanting to enroll for the extra semester and include a list of courses planned for the additional semester. Such requests are usually granted when there appears to be no feasible way for the student to complete the professional curriculum or the degree requirements without the extra semester.

Freshmen entering the college with 15 transfer credits have seven semesters in which to complete the degree. Transfer students must complete at least 60 credits at Cornell.

Mature students (those at least twenty-four years old at the time of matriculation) are not required to petition the college registrar for approval to study beyond the usual eight semesters.

Exemptions from Requirements

Students who want an exemption from a specific graduation or major requirement may petition, and approval may be given under certain circumstances. Full information on the petition process is given in the human ecology Student Guide. Petition forms are available in the Office of Student Services, N101 Martha Van Rensselaer Hall.

Procedures

Course Enrollment

Students are expected to complete course enrollment during a designated period each semester. Failure to do so carries a $10 penalty, which can be waived only if circumstances are completely beyond the student’s control. It is the student’s responsibility to find out the dates of course enrollment.

Before or during course enrollment, students talk to a departmental adviser or college counselor, or both, about their program plans. Students must have their course enrollment schedule signed by their departmental major faculty adviser or by a college counselor if they have not declared a major. A listing of course changes plus directions for course enrollment is issued by the Office of the College Registrar before the start of course enrollment. Last-minute course changes are posted in that office as well as in the Counseling Office, N101 Martha Van Rensselaer Hall. Students will also need the Course and Time Roster, issued by the Office of the University Registrar each semester before course enrollment.

Since new students starting at midyear do not have an opportunity to enroll in courses until after they arrive on campus, the college tries to reserve places for them in human ecology courses. The exact time for enrolling in such courses is listed on the orientation schedule given to all new students. For the first three weeks of the term, new students have an opportunity to add courses in other divisions of the university as well as in human ecology.

Freshmen and transfer students registering for the first time in the university in the fall term enroll in their courses during the summer before they arrive on campus.

Continuing students enroll for courses for fall semester in March or April, for spring semester in October or November preceding the beginning of the term. Course enrollment materials are mailed to each new student; continuing students are notified of course enrollment dates by posters and notices in the Cornell Daily Sun. Course enrollment materials are available from the Office of Student Services and must be completed and filed in the Office of the College Registrar by the announced deadline.

Permission of the Instructor

Certain courses may be taken only with the permission of the instructor, as indicated in the course description. The instructor’s permission must be obtained before the student enrolls in the course. After giving permission, the instructor initials the green course enrollment schedule or signs the course-enrollment form, which can be obtained from the Office of the College Registrar or the Office of Student Services.

Students interested in taking a course in the Department of Art in the College of Architecture, Art, and Planning are required to register with the departmental secretary before enrolling in the course. Seniors who want to take an elective course in the Johnson Graduate School of Management are required to obtain permission of the instructor on a course authorization form that the student then files with that school’s registrar in 312 Malott Hall.

Special Studies Courses

Each department in the College of Human Ecology (CEH, DEA, HDFS, HSS, DNS, and TXA as well as the Field and International Study Program) offers special studies courses that provide an opportunity for students to do independent work not available in regular courses. One of those courses, designated 300, Special Studies for Undergraduates, is intended primarily for students who have transferred from another institution and need to make up certain course work.

The other special studies courses are 400, Directed Readings; 401, Empirical Research; and 402, Supervised Fieldwork. Those courses are normally taken by upperclass students, and work is supervised on an individual basis by a faculty member in the department in which the course is offered. It is important to enroll in the appropriate course number (300, 400, 401, or 402) for a special project.

Students who want to take a special studies course must talk with the faculty member under whose supervision the study would be done and then prepare a plan of work. If the faculty member agrees to supervise the study, a multiplicity special studies form must be filled out, describing the study to be pursued. Signatures of the instructor and the department chairperson as well as the student’s departmental adviser must be on the form before it is taken to the Office of the College Registrar, where the student will officially register for the course by filling out a course-registration form. Forms and instructions are available in the Office of Student Services.
To register in a special studies course taught in a department outside the college, students should follow the procedures established for that department.

Course Loads

The normal course load in the college ranges from 12 to 18 credits. During the course enrollment period, no student may enroll for more than 15 credits or five courses, whichever is greater, without special permission from the college registrar. To receive permission, a student attaches a note to the green course schedule, citing reasons(s) for carrying a heavier load, before handing it in to the Office of the College Registrar.

Credits beyond 15 may be added during the change-of-registration period at the beginning of the semester without special permission from the college registrar. If students are given to them, and their IDs are validated.

Registration at Barton Hall. At that table they hand in their college registration card and in return receive a computer printout of the courses for which they are officially registered. Students who fail to register by the time required to keep abreast of courses tends to increase as the semester progresses. Courses cannot be dropped after the seventh week of classes without petitioning, so students should try to avoid the need to drop courses.

Except for those with mature-student status, students must carry at least 12 credits (exclusive of physical education). In special cases, a student may petition to carry between 8 and 12 credits. Forms for petitioning and advice on how to proceed are available from the Office of Student Services.

Except for mature students, it is seldom possible to have tuition prorated if a student carries fewer than 12 credits during a semester. (See the college registrar for more information.)

Students of mature status may carry 6 to 12 credits without petitioning and may have their tuition prorated. However, at the beginning of each term, mature students planning to take a light course load should pick up a proration of tuition form from the Office of the College Registrar, fill it out, have it signed by the college registrar, and return it to the bursar's office in Day Hall.

Oversubscribed Courses

Enrollment in many human ecology courses is limited. When a course is overenrolled, students are generally assigned on the basis of seniority. Students, professional groups may be considered. Those students not admitted to a course may be placed on a waiting list and will find a note to that effect attached to the course enrollment printout.

Late Course Enrollment

Students who fail to enroll in courses by a deadline must normally wait until the beginning of a semester to enroll and must pay a $10 fee. Extensions are sometimes granted if requested from the college registrar before the end of course enrollment. In general, such extensions are only granted for medical reasons supported by a doctor's statement. Students who fail to meet the deadline for any reason should see the college registrar as soon as possible. In some cases, if the delay was absolutely unavoidable, the student may be allowed to enroll in courses late, and it is sometimes possible to have the fee waived.

University Registration

The time and place of university registration is announced by the Office of the University Registrar. At registration, students fill out and return materials that are given to them, and their IDs are validated.

After completing university registration, students proceed to the College of Human Ecology table in Barton Hall. At that table they hand in their college registration card and in return receive a computer printout of courses for which they are officially enrolled. It is the student's responsibility to check the listing for accuracy of course numbers, credits, and other data. If there are errors, they should be corrected immediately.

Procedures for making changes because of errors in the printout, as well as for other reasons, are described below.

During university registration for the fall semester, each continuing student receives a copy of his or her summary of record from the Office of the College Registrar. The summary shows which graduation and major requirements have been completed. Students who have any questions about the summary's accuracy should see an appropriate person in the Office of the College Registrar.

Late university registration. A student who misses registration day must pay a $75 penalty during the first three weeks. The late-registration fee is increased by $10 each week for the fourth, fifth, and sixth weeks and by $25 for each additional week.

Late university registration is held during the first three weeks of each term. After the first week of classes, students must also have the written permission of the college registrar before they will be allowed to register in the university. After the third week of classes, students registering late must also have the permission of the Office of the University Registrar in addition to the written permission of the college registrar and pay the appropriate late fee.

After completing late university registration, students must take their college registration cards to the Office of the College Registrar, where they will then receive computer printouts of courses for which they are officially registered. Students who fail to register by the seventh week of the term will be withdrawn from the university. Students who want to return must reapply through the Admissions Committee.

Course Enrollment Changes

Deadlines

- During the first three weeks of the term, courses may be added or dropped without charge.
- From the fourth through the seventh week of the term, course changes may be made with the permission of the instructor and payment of a $10 processing fee.
- After the seventh week of the term, no course change may be made without the permission of the college registrar.

Petitions are usually granted only in circumstances beyond a student's control (for example, illness). A student petitioning for medical reasons should provide substantiating medical evidence with the petition.

Also, a student submitting a petition after the seventh week of the term requesting permission to drop a course must have his or her faculty advisor write a statement to accompany that petition indicating whether or not the advisor supports the request.

After the eighth week of the term, any student granted permission to drop a course after petitioning will automatically receive a grade of W (Withdrawn), and the course will remain on the official transcript.

After the third week of the term, instructors have the right to consider students' requests for course changes on an individual basis or to announce at the beginning of the term a specific date between the fourth and seventh weeks beyond which they will no longer approve course changes.

Procedures

Students who need to make course enrollment changes should make them as soon as possible. It is in the student's advantage to add the desired courses as soon as possible, and it is helpful to other students if unwanted courses are dropped promptly.

Students should assess their workload carefully at the beginning of each term. If in the first week or two the instructors do not discuss the amount of material to be covered and the extent of assignments, students are advised to ask about course requirements.

Some of the same procedures are required for course enrollment changes as were necessary for course enrollment— for example, permission of the instructor must be obtained for a course requiring it, and the student's responsibility to check the listing for accuracy of course numbers, credits, and other data. If there are errors, they should be corrected immediately.

Procedures for making changes because of errors in the printout, as well as for other reasons, are described below.

Specific procedures for making course changes during the change-of-enrollment period (first three weeks of classes) are listed below. The student should:

1) Obtain a course-change form from the Office of the College Registrar or from the Office of Student Services.

2) Drop the course out and take it to the appropriate office for signature: for human ecology courses, the forms should be taken to the Office of the College Registrar; for courses outside the college, the forms should be taken to the appropriate departmental offices.

3) Ask the person handling the class lists to add the student's name to the list of enrolled students for a course being added or to remove his or her name from the class list for a course being dropped. That person should sign the course-change form in the appropriate place.

4) Turn all signed forms in to the Office of the College Registrar, including the forms for out-of-college courses. Enrollment cannot be officially changed until the signed forms are filed in the registrar's office. For example, students who fail to "cancel" a course after they are no longer attending are in danger of receiving an F in the course, because they are still officially enrolled. There is no charge for course changes during the first three weeks of classes.

5) Receive carbon copies of each course-change form at the time it is turned in. These copies are stamped with the date of receipt. It is important to keep these copies in case they are needed to verify later that the forms were filed.

A student who wants to have his or her name placed on a waiting list for a human ecology course should be aware that such lists are compiled during the change-of-enrollment period on a first-come-first-served basis, without regard to seniority or other factors. Students not admitted to a course may be placed on a waiting list. There is no charge for course changes during the first three weeks of classes.

For a student whose petition is granted receive a letter from the Office of the College Registrar or from the Office of Student Services. The petition form should be filled out and catalog descriptions attached for the courses the student wishes to add or drop. That petition form should be sent to the college registrar for approval.

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After the third week of classes, a student may not make course changes without petitioning for approval. Students should realize that they are expected to attend classes and do assigned work until a petition has been formally approved.

Study in Absentia

Under certain conditions, credit toward a Cornell degree may be given for study in absentia, that is, study a student undertakes at an accredited institution away from Cornell after approval by the College of Human Ecology. To be eligible for credit for such study, a student must be in good academic standing and must receive permission in advance from the college registrar. Students not in good standing may study in absentia but will not receive transcript credit until they return to good standing.

In absentia petition forms are available in the Office of Student Services. The petition form should be filled out and catalog descriptions attached for the courses the student wishes to add or drop. That petition form should be sent to the college registrar for approval.
absentia after the work has been done, but there is no guarantee that the work will have any credit assigned if permission has not been obtained in advance. A $15 fee is charged to bind a student's in absentia registration. If the in absentia study is undertaken during the summer, the $15 fee is charged only if the summer study is for more than 8 credits. A form is included with the letter sent to the student giving permission to study. This form must be completed and returned to the Office of the College Registrar, 146 Martha Van Rensselaer Hall, along with a check for $15, before the student is officially registered in absentia.

Up to 15 credits may be taken in absentia as long as the work done does not duplicate courses already taken and the study is relevant to the student's program and the requirements of the college. More than 15 credits of work in absentia may be allowed under the following conditions: (1) the work taken represents a special educational opportunity not available at Cornell, (2) it relates to the student's particular professional goals, and (3) that goal is consistent with the focus of the college. To take more than 15 credits in absentia, a student must also have the petition approved by the college registrar, who will evaluate the proposed program. Forms are available in the Office of Student Services.

If part of the work for which credit is sought is to be applied to requirements of the major, the petition will be sent to the appropriate department for approval. If credit is sought for work to be done in a modern foreign language that the student has previously studied, the approval of the Department of Modern Languages and Linguistics in the College of Arts and Sciences must be obtained.

Students are responsible for having the registrar of the institution where they study in absentia send transcripts of grades to the Office of the College Registrar at the College of Human Ecology. Credit can then be officially assessed and applied toward the Cornell degree. Only credits (not course names and grades) for study in absentia appear on the Cornell University transcript.

A student who holds a Regents' or Children of Deceased or Disabled Veterans Scholarship may claim that scholarship for study in absentia if the study is done in a college in New York State and if it is for a maximum of 15 credits acceptable to the College of Human Ecology.

The rules regarding study in absentia apply to transfer students with the stipulation that at least 60 credits must be taken at Cornell. At least 40 of the 60 credits must be in the College of Human Ecology at Cornell. Transfer credits may be given for equivalent human ecology credit. (No more than 20 credits of equivalent credit may be applied to the 40 credits required in human ecology course work.)

Leaves of Absence

Students may request a leave of absence before the beginning of the semester for which a leave is desired or during the first seven weeks of the semester. A leave may be extended for a second semester by requesting an extension in writing from the Office of the College Registrar. Students who are contemplating taking a leave of absence are urged to discuss plans with a counselor. If the student decides to take a leave of absence, a counselor will provide the necessary forms to complete, which should be taken to the Office of the College Registrar, where the official leave will be processed.

Requests for a leave of absence received after the first seven weeks of the semester, or requests for a leave of absence from students who have already had two semesters' leave of absence, will be referred for action to the Committee on Academic Status. The committee may grant or deny such requests, attaching conditions as it deems necessary. Leaves of absence after the first seven weeks are generally granted only when there are compelling reasons why a student is unable to complete the semester, such as extended illness.

If a leave of absence is requested after the first seven weeks, students are advised to attend classes until action is taken on their petitions. A student whose petition for a leave of absence is denied may choose to withdraw or to complete the semester.

The academic records of all students who are granted a leave of absence are subject to review, and the Committee on Academic Status may request grades and other information from faculty members to determine whether the student should return under warning or severe warning or in good academic standing.

Withdrawal

A withdrawal is a termination of student status at the university. Students may voluntarily withdraw at any time by notifying a counselor and the Office of the College Registrar. Students contemplating such an action are urged to discuss their plans with a counselor.

There are instances in which a student may be given a withdrawal by the Office of the College Registrar. If a student leaves the college without an approved leave of absence or does not return after the leave has expired, the student will be given a withdrawal after the seventh week of the term in which he or she failed to register.

A student who has withdrawn from the college or who has been given a withdrawal by the Office of the College Registrar and who wishes to return to the College must reapply through the Committee on Academic Status for consideration, and that committee may stipulate criteria under which the student may be readmitted to the college.

Petition Process

There are two kinds of petition forms: the general petition form, which is multicopied, and the in-absentia petition form, which is a single sheet and has no copies attached. Both types of forms are available from the Office of Student Services, N101 Martha Van Rensselaer Hall.

The use of the general petition form is described in the human ecology Student Guide: After completing them, students should file general petition forms in 146 Martha Van Rensselaer Hall. They will find out if a petition has been granted or denied by checking their mail folders in the lobby.

The in absentia petition form is used when a student wishes to study at another institution to take courses the student wishes to take at the other institution must be attached to the petition. Petition forms are available in human ecology Student Guide for regulations concerning in absentia study.) This form is also used for students who wish to take more than 15 credits in absentia during their college career. Catalog descriptions of the courses the student wishes to take at the other institution must be attached to the petition form. After completing the petition, the student should file the in absentia petition form in 146 Martha Van Rensselaer Hall. A letter in the mail will inform the student of the decision.

It should be noted that although many kinds of requests are petitionable in the college, some kinds of situations are governed by college faculty legislation and cannot be altered by petition. A student is in doubt about whether a request could be considered by petition, he or she may discuss the matter with the college registrar.

Grades

Students must consult the in absentia petition form in 146 Martha Van Rensselaer Hall, along with a check for $15, before the student is officially registered in absentia.

Grades

See the "Grading Guidelines" section for information on the official university grading policies.
succeeding semesters, he or she must go to the Office of the College Registrar to fill out and sign the remainder of the form.

If the work is satisfactorily completed within the required time, the course appears on the student's official transcript, with an asterisk and the final grade earned. A student who completes the work in the required time and expects to receive a grade must take the course instructor.

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

Dean's List. Excellence in academic achievement is recognized each semester by placing on the Dean's List the names of students who have completed satisfactorily at least 12 credits with letter grades other than S or U and who have a semester grade-point average of 3.5 or above. No student who has received an F or U in an academic course will be eligible.

Omicron Nu seeks to promote graduate study and research and to stimulate scholarship and leadership toward the well-being of individuals and families. As a chapter of a national honor society in the New York State College of Human Ecology, it stimulates and encourages scholarly inquiry and action on significant problems of living—at home, in the community, and throughout the world.

Students are eligible for membership if they have attained junior status and have a cumulative average of 3.5 or above. No student who has received an F or U in an academic course will be eligible.

Field and International Study Program

Field Study

100 Skills for Learning in the Field

Spring. 2 credits. Prerequisites: permission of instructor. S-U grades optional. First 7 weeks of semester, W 1:30–4:25.

Field Study Office During the preceding semester's course enrollment period, applications are due in the Field Study Office at the college community upon return to Cornell (graduating seniors may make special arrangements). Credit is available for students to arrange for combined interdepartmental and departmental sponsorship and supervision.

Information on course enrollment and internship opportunities is available in the Field Study Office. 159 Martha Van Rensselaer Hall. Students should begin planning more than one full semester before leaving campus for an internship.

Field Experience in Community Problem Solving

Fall or spring. 3–15 credits. S-U grades optional for up to 12 credits. Limited to 10 students; intended for juniors or seniors. Prerequisites: ID 200. Enrollment by permission of instructor. Applications due in the preceding semester's course enrollment period. Not offered 1987–88.

Interdepartmental Courses

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the course is signified by formal presentation of project results to the contracting organization’s staff, board of directors, or other appropriate administrative units and to members of the oversight committee, together with submission of an academic analysis of the implementation and the course instructor. Credit is variable to allow students to arrange for combined interdepartmental and departmental sponsorship and supervision.

Information on projects is available during course enrollment in the Field Study Office, 159 Martha Van Rensselaer Hall. Students may assist in the planning and project-identification process by making their interests known to the office a full semester before intended enrollment in the course.

408 The Ecology of Urban Organizations: New York City Field Experience Fall or spring. 9–15 credits. Limited to 25 students; intended for juniors and first-semester seniors. Prerequisites: ID 200 and permission of instructor. Applications due in the Field Study Office during the preceding semester’s course enrollment period. Students may enroll in ID 408 for 9 to 15 ID credits and for 0 to 6 departmental credits, depending on internal regulations. Information on these policies and on placements is available in 159 Martha Van Rensselaer Hall. Students should begin planning at least one semester before they apply to this course.

A course designed to enhance students’ understanding of organizational behavior and decision making through a program that integrates internship experience with cross-cultural learning. Students, participating as interns in a variety of New York City agencies and firms, are challenged to examine interpersonal, institutional, interorganizational, and cultural processes shaping and directing human and human problem solving in formal organizations. From an ecologistic perspective, students explore how such factors as employee motivation, organizational culture, formal structure, communication patterns, leadership style, technology, demographics, politics, and regional economics influence patterns of staff interactions, management policy, and organizational initiatives. The course focuses on the practical uses of cross-cultural experience in relation to international, interdepartmental and departmental processes shaping and directing an interdependent world, the course relates personal experience to socioeconomics factors structuring living situations at home and abroad. Among the issues to be pursued are intercultural theory and (re)acclimatization, patterns and conditions of work, relationships and patterns of exchange, ideology and social explanation, personal autonomy and institutional contexts, power and authority, gender, ethnicity, exploitation and oppression, and forms of resistance. The course will feature readings, special projects, presentations and discussions encouraging and facilitating the analysis and understanding of individual cross-cultural experience. The purpose of the course is to encourage the analysis and integration of cross-cultural experience in relation to international processes, academic interests, and personal concerns of students.

Consumer Economics and Housing Courses


110 Introduction to Consumer Economics I Fall or spring. 3 credits. S-U grades optional. Students who have taken Economics 101 or another introductory microeconomics course should not register for this course.

M.W.F. 9:05. P. Zorn.

Principles of microeconomics with an emphasis on applicability to consumer behavior. The course acquaints students with the basic economic models of household and firm behavior and their interaction in markets. The goal is to provide students with the ability to analyze the economic implications of consumer decisions and public policies.

111 Introduction to Consumer Economics II Spring. 3 credits. S-U grades optional. Students who have taken Economics 102 or another introductory microeconomics course should not register for this course.


Principles of macroeconomics with an emphasis on the relevance of economic policies to consumers and households. Topics include national income accounting, aggregate demand and aggregate supply, the role of monetary and fiscal policy in confronting the problems of inflation and unemployment, and international economics.

148 Sociological Perspectives on Housing Fall. 3 credits. S-U grades optional.


An introductory sociology course analyzing the distribution of housing and population within urban areas. Students focus on the link this urban social and spatial structure has to the quality of urban life. Topics include urban ecology, mobility and migration patterns, suburbanization, segregation, urban social stratification, community power, crime, and poverty.

233 Marketing and the Consumer Spring. 3 credits. Prerequisite: CEH 110 or equivalent. M.W.F. 10:40–10:55. E. S. Maynes.

This course introduces students to marketing—the processes and institutions by which products are conceived, tested, priced, advertised, distributed, and evaluated. Case studies and outside lecturers are used to impart reality to the course. Emphasis is given to the viewpoint of both the seller and the consumer. Students are required to undertake a project involving a marketing problem.

247 Housing and Society Fall. 3 credits. S-U grades optional.

M.W.F. 11:15. P. Chi.

A study of contemporary American housing issues as related to the individual, the family, and the community. The course focuses on the current problems of the individual housing consumer, the resulting implications for housing the American population, and governmental actions to alleviate housing problems.

300 Special Studies for Undergraduates Fall and spring. Credits to be arranged.

Hours to be arranged. Staff.

Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multiplicity description of the study they want to undertake, on a form available from the Student Services Office. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

301 Special Studies for Undergraduates Fall and spring. 1 credit S-U grades only. Six 1½ hour lecs., weeks 2–4 of term.

Hours to be arranged. Staff.

Topics covered will be utility maximization, marginal analyses, derivation of demand curves, price and income effects, present value, and other relevant topics.

310 Intermediate Microeconomics Spring 4 credits. Prerequisite: CEH 110 or equivalent.

Lecs. M.W.F. 10:10 or 11:15; disc. M.W. 2:30 or 3:35 or R.2.30 or 3:35. L. Gosske.

Theory of demand and consumer behavior including classical and indifference curve analyses; theories of production and cost, models for the following markets—competitive, monopoly, monopolistic competition, oligopoly, and inputs; general equilibrium; welfare economics; public goods; risk

312 Family Resource Management Spring. 3 credits. Not open to freshmen. S-U grades optional.

M.W.F. 9:30. Staff.

Identifies and analyzes basic management concepts. The focus is on the use of resources to attain goals and meet demands.

315 Personal Financial Management Spring. 3 credits. Preference given to human ecology students; limit 200; not open to freshmen. S-U grades optional.


The study of personal financial management at various income levels and during different stages of the family life cycle. Topics include the use of budgets and record keeping in achieving family economic goals, the role of credit and the need for financial counseling, economic risks and available protection, and alternative forms of saving and investment.
325 Economic Organization of the Household Fall. 3 credits. Prerequisite: CEH 110 or equivalent. S-U grades optional.
M W F 9:05. W. K. Bryant. Theories and empirical evidence about how households spend their resources to use goods and services. Analysis of household expenditure functions and theories of household decision making. The role of government in influencing household behavior. S-U grades only.

332 Consumer Decision Making Spring. 3 credits. Prerequisite: CEH 110 or permission of instructor.
T R 2:30–3:45. E. S. Maynes. This course is designed to help individuals make more effective choices as consumers. In pursuit of this goal, the course introduces the student to relevant concepts, theories, and research from economics, consumer economics, marketing, and statistics. Topics covered include informationally imperfect markets, assessing consumer information, seeking redress, bargaining, dealing with inflation, decision-making rules, the concept of consumer sovereignty, and consumerism. Students prepare price-quality maps of local consumer markets. A second part of the course introduces the student to the concept of consumer sovereignty and assesses the performance of markets as critiqued by economists and consumers.

341 Fundamentals of Housing Economics Spring. 3 credits. Prerequisite: CEH 110 or equivalent. S-U grades optional.
T R 1–2:15. P. Zorn. This course is designed to provide students with the economic skills required to understand housing markets, problems, and policies. Microeconomic theory will be used to develop a model of household and firm behavior. This model provides the framework for an analysis of empirical studies by housing economists. Topics will include the tenure-mobility decision, estimation of the supply and demand for housing, the effects of inflation and the income tax system on the housing market, and the treatment of housing as a heterogeneous durable good.

355 Wealth and Income Spring. 3 credits. Open to sophomores, juniors, and seniors; graduate students may elect to audit and write a research paper for 1 to 2 credits under CEH 600. Prerequisites: CEH 110–111 or equivalent. S-U grades optional.
M W F 9:05. J. Gerner. The wealth and income positions of American households are defined and described and their economic determinants discussed along with the impacts of tax and expenditure policies and the economics of the political positions for and against such policies.

400–401–402 Special Studies for Undergraduates Fall–spring. Credits to be arranged. S-U grades optional.
Hours to be arranged. Staff. For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of CEH not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multiplicity of description of the study they want to undertake, on a form available from the Counseling Office. This form must be signed by the instructor directing the study and the department chairman and filed at course registration or within the change-of-registration period after registration. To ensure review before the close of the course registration or change-of-registration period, early submission of the special studies form to the department chairman is necessary. Students desiring consultation with their faculty supervisor, should register for one of the following subdivisions of independent study:

400 Directed Reading
For study that predominantly involves library research and independent reading.

401 Empirical Research
For study that predominantly involves data collection and analysis.

402 Supervised Fieldwork
For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

411 Time as a Human Resource Fall. 3 credits. Prerequisites: one course in sociology. Recommended: one course in microeconomics. S-U grades optional.

[430 The Economics of Consumer Policy Fall. 3 credits. Open to juniors, seniors, and graduate students. Prerequisites: CEH 110–111 or permission of instructor. Offered alternate years. Not offered 1987–88; next offered 1988–89.
T R 10:10–11:25. S. White-Means. Students are acquainted with the basic approaches to consumer policy and perform economic analyses of specific consumer policy issues. Consumer sovereignty, consumer sovereignty, and consumer representation are all dealt with, along with economic analyses of current and enduring consumer policy proposals and programs.]

[431 Consumer Behavior Fall. 3 credits. Open to seniors and graduate students. Prerequisite: CEH 110 or equivalent. Offered alternate years. Not offered 1987–88; next offered 1988–89.
T R 12:20–2:15. E. S. Maynes. This course applies the concepts, models, and research techniques in empirical sciences to the explanation and prediction of consumer behavior. The student is exposed to representative theories, models, problems, and research techniques. Special efforts are made to insure that students encounter problems approached both by the problem and consumer viewpoints as well as from the disciplines of economics and social psychology. Once a week graduate students and undergraduate students will meet in separate sessions to review and appraise research, with pieces of consumer behavior research.]

[433 Consumerism and the Consumer Affairs Profession Fall. 3 credits. Prerequisite: junior or senior status. Offered alternate years.
T R 12:20–1:45. E. S. Maynes. This course is intended for students who in the future might become part of or come into contact with (1) consumerism, (2) the consumer movement, and (3) the consumer affairs profession. The course analyzes interactions among consumers, the consumer movement, and consumer representatives in business and government. The history, present state, and probable future and function of consumerism and the field of consumer affairs will be treated. Extensive use will be made of articles by consumer affairs professionals from corporations, consumer organizations, and government.

[444 Housing for the Elderly Spring. 3 credits. Prerequisite: CEH 247 or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1987–88; next offered 1988–89.
T R 10:10–11:25. G. H. Black. This course focuses on the housing needs of the elderly, their current housing conditions—living arrangements, tenure patterns, housing quality and housing expense burden—and socioeconomic and psychological aspects of the housing environment of the elderly. Attention is also given to government housing programs for the elderly, integrating housing and related social service activities, and options for alternative housing. Extra work is required for graduate credit.]
Research seminar designed to provide a forum for graduate students in consumer economics and housing to present their own thesis research at an early stage and to provide critical input for other graduate students.

602 Family Resource Management Concepts Fall. 3 credits. Prerequisite: graduate standing. T.R. 10-10:30. Staff A study of the basic concepts and the development of conceptual frameworks in family management.

603 Economics of Consumer Demand Fall. 3 credits. Prerequisite: Economics 311 or 313 or concurrent enrollment in either S-U grades optional. T.R. 10:10. J. Gerner, P. Zorn. Introduction at the graduate level to theory and empirical research on household demand, consumption, and savings. Particular attention is paid to problems associated with the demand for consumer durables, with applications to housing.

604 Economics of Household Behavior Spring. 3 credits. Prerequisite: Economics 311. S-U grades optional.

605 (628) Information and Regulation Spring. 3 credits. Prerequisite: Economics CEH 603. T.R. 2:30-3:45. S. White-Means. A survey of the problems and policies accompanying informational failures and other market failures with regard to consumer well-being. Governmental regulation of products, of producers, of consumers, and of prices is examined. Antitrust activity, disclosure requirements, advertising restrictions, and regulatory agencies are examined in terms of their ability to serve the public interest or to serve special interests. Economic analysis, rather than institutional structure, is emphasized.

640 Fundamentals of Housing Fall. 3 credits. Prerequisite: graduate standing or permission of instructor S-U grades optional. Offered alternate years. Not offered 1987–88, next offered 1988–89. M.W.F. 2:30–3:45. P. Chi. An introductory survey of housing as a field of graduate study. Consideration of the spatial context and institutional setting of housing, the structure and performance of the housing market, housing finance, the house-building industry, the nature and impact of government housing programs, and the social and economic effects of housing regulations.

644 Housing for the Elderly Spring. 3 credits. For description see CEH 444.

645 Housing, Neighborhood, and Community Spring. 3 credits. For description see CEH 445.

648 Household and Family Demography Spring. 3 credits. Prerequisite: graduate standing or permission of instructor. S-U grades optional. Offered alternate years. M.W.F. 2:30. Staff. This course is concerned with the size and composition of households and families; their variation among nations and between subgroups within the nation; changes over time, including both secular trends and change over the life cycle; the determinants of change and variation; and socioeconomic consequences of household variation and change, such as influences on residential mobility and housing adjustments, impacts of family structure on fertility, implications of family composition for female labor-force participation, and effects of household and family structure on economic behavior.

714 Readings in Family Decision Making Fall. or spring. 3 credits. Recommended: a course in family management (preferably CEH 602) and a course in family sociology S-U grades only. Hours to be arranged. Staff. Family decision making is studied from the perspective of decision processes, behavior of decision makers, and decision context. The relationship of decision making to family management is also explored.

715 Family Financial Management Spring. 3 credits. Prerequisites: an introductory statistics course, CEH 315 or equivalent, and CEH 602. S-U grades optional. Offered alternate years. W. 2:45. R. Heck. The study of management theory applied to the financial dimension of the household. Resource use is examined in the context of optimizing financial resources such as income, expenditures, savings, credit, and investments. A critical examination of current theories in the area of management and a survey of literature in the fields are included.

726 Consumption and Demand Analysis Spring. 3 credits. Prerequisites: intermediate microeconomics, CEH 603, and permission of instructor. S-U grades optional. Offered alternate years. M.W.F. 8:30. W. K. Bryant. Major developments in the theory of household behavior with applications to consumption, saving, demand, and expenditure behavior of households. Complete demand systems are surveyed along with theoretically justified specifications of price, income, and demographic variables. The empirical implications of household production for demand are examined. It is believed that empirical implications for demand of bargaining models of the household are discussed.

727 Family Economics Fall. 3 credits. Prerequisite: permission of instructor. Recommended but not required: CEH 411. S-U grades optional. Offered alternate years. Not offered 1987–88, next offered 1988–89. Hours to be arranged. J. Gerner. This course examines the public sector policies that influence family time-allocation decisions. Particular attention is given to the time allocated by female family members to non-household activities and how these activities are influenced by outside economic forces and by internal family characteristics. Family demography is also examined.

742 Housing in an Urban Context Spring. 3 credits. Prerequisite: Economics 311 or equivalent. S-U grades optional. Offered alternate years. Not offered 1987–88, next offered 1988–89. M.W.F. 10:10. J. Reschovsky. An examination of housing issues from a micro-economic perspective. The course first establishes a context for the study of housing by briefly exploring economic theories of the structure of urban environments. The supply, demand, and market equilibrium of housing are then considered along with special topics on rent control, filtering, and discrimination. The local government perspective is introduced by considering the issues of zoning and land-use controls, suburbanization sprawl, and property taxation.

899 Master's Thesis and Research Fall and spring. Prerequisite: permission of the chairperson of graduate committee and instructor. S-U grades optional. Graduate faculty.

999 Doctoral Thesis and Research Fall and spring. Prerequisite: permission of the chairperson of graduate committee and instructor. S-U grades optional. Graduate faculty.

Design and Environmental Analysis Courses

101 Design I: Fundamentals Fall or spring. 3 credits. Each section limited to 18 students. Priority given to interior design majors. Option I majors must take DEA 101 in fall. Approximate cost of materials, $60.

102 Design II: Fundamentals Fall or spring. 3 credits. Each section limited to 18 students. Priority given to interior design majors. Option I majors should take DEA 102 and DEA 115 concurrently in spring. Approximate cost of materials, $125; shop fee, $10.

111 Introduction to Design Spring. 3 credits. Each section limited to 18 students. Priority given to interior design majors. Prerequisite: DEA 101. Option I majors should take DEA 102 and DEA 115 concurrently in spring. Approximate cost of materials, $125; shop fee, $10.

115 Drawing Fall or spring. 3 credits. Each section limited to 18 students. Fall section for nonmajors; priority given to DEA majors in the spring. Option I majors strongly encouraged to take DEA 102 and DEA 115 concurrently in spring. Minimum cost of materials, $50.

117 Drawing the Clothed Figure Spring. 3 credits. Enrollment limited to 18 students. A basic drawing course is highly recommended. Priority given to TKA Option I students. S-U grades optional. Approximate cost of textbook, $30; minimum cost of supplies, $40. M.W.F. 9:05–11:05. C. Garner. To improve the student's ability to illustrate two-dimensionally the interaction of draped fabric and the human form and to develop awareness of clothing as a design medium. Emphasis is on development of techniques and skills in selected media necessary for the communication of design ideas.


To introduce the influence of physical environment on human behavior. Topics include environmental influences on crowding, community crime, and community ecology.
friendship; environmental needs associated with characteristics such as stages in life cycle, life styles, social classes, family structures, and handicaps; person-environment fit for lighting, acoustics, indoor air quality and ventilation, and thermal comfort; introduction to human factors and systems analysis; effects of environmental factors on perception/cognition; user-responsive design; participatory design programming; and postoccupancy evaluation.

201 Design III: Basic Interior Design Fall. 5 credits. Each section limited to 18 students. Prerequisites: DEA 101, 102, and 115. Coregistration in DEA 203 is required. Recommended: DEA 111 and 150. Minimum cost of materials, $120; shop fee, $10; optional field trip, approximately $60; diazo machine fee, $8. MWF 3:30–5:25. G. C. Millican, R. Eshelman. Second-semester intermediate-level interior design studio. Focus is on development of basic proficiency in interior design skills. The course is structured around a series of elementary interior and interior-product design problems of 3 to 5 weeks in length.

202 Design IV: Basic Interior Design Spring. 5 credits. Each section limited to 18 students. Prerequisites: DEA 201 and 202. Prerequisites or corequisites: DEA 111 and 1150. Minimum cost of materials, $120; diazo machine fee, $8. MWF 3:30–5:25 and TR 1:25–4:25. P. Eshelman, G. C. Millican. Second intermediate design studio. Emphasis of the course is on continued development of basic proficiency in design skills through exposure to a selected set of interior and interior-product design problems of limited complexity. Each problem of 3 to 5 weeks duration is structured to emphasize different aspects of the design process.

203 Design Communications Fall. 1 credit. Enrollment limited to 40 students. Priority given to DEA Option 1 majors. MWF 1:25–3:20. A. Hedge. Communication techniques for interior designers. Focus is on selected graphic and representational techniques useful to designers in understanding and developing design proposals during the design process, and on communicating interior design proposals to clients and users. Plans, sections, perspectives, isometrics, rendering techniques, models and model photography, and techniques for presentations of design proposals to audiences will be covered.

204 Introduction to Building Technology Spring. 1 credit. MWF 1:25–3:20. L. M. Haley. Introduction to building technology for interior designers and facility managers. Emphasis is placed on developing basic understanding of buildings and building systems and their implications for interior design and facility management. Covers basic building types; structural systems; construction materials and methods; HVAC systems; plumbing, electrical, lighting, fire, and security systems; and telephone, computer, and other communication systems.

251 Historic Design I: Furniture and Interior Design Spring. 3 credits. Prerequisites: DEA 101 and 111. Recommended sequence: DEA 251, 252, and 353. MWF 9:05. G. C. Millican. A study of the patterns of historical development and change in architecture, furniture, and interiors from people's earliest expressions to mid-eighteenth century as they reflect the changing cultural framework of Western civilization, excluding America.

252 Historic Design II: Furniture and Interior Design Fall. 3 credits. Prerequisite: DEA 101. Corequisite: DEA 111. Recommended sequence: DEA 251, 252, and 353. MWF 9:05. G. C. Millican. A study of the patterns of historical development and change as revealed through American architecture, furniture, and interiors, 1650–1865. Design forms are covered from the viewpoint of historical context as they express the efforts, values, and ideals of American civilization.

251 Fundamentals of Interior Design Fall. 3 credits. Enrollment limited to 20 students. Intended for nonmajors but open to DEA majors. Minimum cost of materials, $30. TR 1:25–4:25. G. C. Millican. A studio course that emphasizes the fundamental principles of design applied to the planning of residential interiors and coordinated with family and individual needs. Studio problems explore choices of materials, space planning, and selection and arrangement of furniture, lighting, and color. Illustrated lectures, readings, and introductory drafting and rendering techniques are presented.

300 Special Studies for Undergraduates Fall or spring. Credit to be arranged. Hours to be arranged. Department faculty. Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a multiplicity of design projects to undertake on a form available from the Student Services Office. The form, signed by both the instructor directing the study and the head of the department, is filed at course registration or during the change-of-registration period.

301 Design V: Intermediate Interior Design Fall. 5 credits. Prerequisites: DEA 111, 150, 201, 202, 203, and 204. Corequisite: DEA 303. Recommended: DEA 459. Minimum cost of materials, $120; shop fee, $10; optional field trip, approximately $60; diazo machine fee, $8. TR 10:10–1:10. MWF 1:25–4:25, or W 3:30–5:25. R. Backman. Intermediate-level interior design studio. The course is organized around a series of interior and interior-product design problems of intermediate-level complexity. 3 to 5 weeks in duration. Focus is on development of design skills and an understanding of a selected set of generic problem types.


303 Introduction to Furnishings, Materials, and Finishes Fall. 1 credit. W 1:25–3:20. P. Eshelman, A. Hedge. Basic understanding of structure and systems types and materials; interior products and equipment such as work-stations; window, wall, and floor coverings; ceiling and lighting systems; and materials and finishes. Emphasis is placed on criteria for selection of furnishings, materials, and finishes for typical interior design and facility management problems.

304 Introduction to Professional Practice of Interior Design Spring. 1 credit. W 3:30–5:25 A. Basinger. Introduction to organizational and management principles for delivery of interior design and facility management services. Covers basic organizational principles and management functions within interior design and facility management organizations, work flow and scheduling, legal responsibilities and concerns, contracts, basic contract documents such as drawings, specifications, construction drawings, and project coordination processes. Emphasis is placed on project development and the use of computer-aided design software.

325 Human Factors: Ergonomics-Anthropometrics Spring. 3 credits. Prerequisite: A 3-credit statistics course. Recommended: DEA 150. TR 10:10–11:30. A. Hedge. Implications of human physical and physiological behaviors in interior design. Emphasis is placed on the design of settings, products, and tasks. An introduction to engineering anthropometry, biomechanics, work physiology, and motor performance. Attention is given to the needs of the elderly, children, and special populations such as the physically handicapped.


349 Graphic Design Spring. 3 credits. Enrollment limited to 20 students. Recommended: design background. Priority given to DEA majors. Approximate cost of materials, $50. MWF 10:10–1:10. M. Boyd. The fundamentals of lettering, typography, layout, and presentation techniques. Printing processes and the application of photography and illustration are also covered. A series of projects explores problems typical of the graphic design field.

350 Human Factors: The Ambient Environment Fall. 3 credits. Recommended: DEA 150. TR 10:10–11:30. A. Hedge. An introduction to human factors in the design of lighting, acoustics, noise control, indoor air quality and ventilation, and the thermal environment. The human environment is viewed as a support system that should promote human efficiency, productivity, health, and safety. Emphasis is placed on the implications for planning, design, and management of settings and facilities.

353 Historic Design III: Contemporary Design Fall. 3 credits. Recommended: sequence: DEA 251, 252, and 353. MWF 11:15–12:05. G. C. Millican. A historical study of the emergence and development of contemporary design, 1885 to the present. Examines the social, economic, technical, and stylistic forces that shape the design forms of the present and includes a critical analysis of selected examples of architecture, interiors, and furniture.

361 Residential Design Spring. 3 credits. Approximate cost of materials, $30. TR 8–11. G. C. Millican. An introduction to residential architectural design. While designing a solution for specified occupant needs, students consider site, orientation, climate, and materials. Drafting work consists of plans, elevations, perspectives, and presentation of solutions. Lectures, discussions, and required readings.
A comprehensive design-problem-solving experience involving the design of an advanced design problem selected by the student and approved by the instructor. The course consists of five phases of three to four weeks each: programming, schematic design and evaluation, design development, including material and finish selection, design detailing, and in-process documentation and the preparation of a professional-quality design presentation.

600 Special Problems for Graduate Students Fall or spring. Credit to be arranged. S-U grades optional.

Hours to be arranged. Department faculty.

Independent advanced work by graduate students recommended by the chairperson and approved by the head of the department and instructor.

645 Design Process and Methods Spring. 4 credits. Limited to 15 graduate and advanced undergraduate students.

T R 7:30-8:30 p.m. S. Danko. Focuses on thinking processes and techniques that support creative problem solving. Design methodologies of specific designers will be examined through discussions and applications to short studio problems by the students. Topics include a historical overview of the role of space in the design process in both professional practice and education. The effect of technology on design thinking and the inherent merits and pitfalls in the four realms of thinking (analytical, intuitive, synthetic, and evaluative) will be discussed.

648 Computer-aided Space Planning and Design Spring. 3 credits. Limited to 12 graduate and advanced undergraduate students. Prerequisites for undergraduates: DEA 201 and 202.

Lec. T R 9:05-10:10, lab, R 10:10-12:20. P. Eshelman. Familiarizes students with computer applications in the planning and design of spaces. Lectures and readings cover needs assessment, furniture and equipment inventory, affinity diagramming, block diagramming, space layout, and specification and schedule preparation for furniture, equipment, and finishes. Laboratories involve the application of computer-aided processes in planning and designing a variety of spaces.

650 Programming Methods in Design Fall. 4 credits. Recommended: DEA 325, 350, and 455. M W F 11:00-12:15, and an hour to be arranged. A. Hedge, E. Ostrander.

A course intended for graduate students who want a more thorough introduction to environmental programming methods than is provided by DEA 459. Each student is required to attend DEA 459 lectures, meet with the instructor and other graduate students for an additional class each week, and do additional readings and projects.

653 Psychology and Office Design Spring. 3 credits. Prerequisite: DEA 250 or permission of instructor.

M W 8:30-9:55. P. Stansal. Intended for students interested in the planning, design, and management of complex organizations. The purpose is to explore how characteristics of offices, including furniture and equipment and policies governing their use and allocation, affect individual and organizational effectiveness. Special topics, such as the human implications of new information technologies and work at home, are also covered.

654 Facility Planning and Management Studio Spring. 4 credits. Prerequisite: permission of instructor.

For graduates and advanced undergraduates interested in facility planning and management. Purpose is to provide basic tools, techniques, and concepts useful in the planning, design, and management of complex facilities. Covers development and implementation of space standards, space allocation policies, space forecasting, programming, linking strategic plans to facility plans, facility change, site selection, building assessment, space planning and design, furniture specifications, and move. Sociopsychological, organizational, financial, architectural, and legal factors are considered.

655 Research Methods in Human-Environment Relations Spring. 4 credits. Prerequisites: DEA 150 or permission of instructor, and a statistics course.

Letter grades only.

M W F 11:15, and an hour to be arranged.

E. Ostrander.

The course develops the graduate student’s understanding and competence in the use of research and analytical tools in the study of the relationship between the physical environment and human behavior. Students attend DEA 455 lectures but have more extensive readings and projects and meet an additional hour each week.

659 Seminar on Facility Planning and Management Fall. 1 credit. For graduate students and advanced undergraduates interested in careers in facility planning and management. S-U grades only.

M 10:10-12:05, and an hour to be arranged.

F. Becker.

A combination seminar-and-lecture course for graduate students with interests in social sciences or design. Graduate students attend DEA 250 lectures but have more-extensive readings and meet an additional hour each week.

668 Design Theory Seminar Fall. 3 credits. Enrollment limited to 15 students.


Directed toward advanced undergraduate and graduate students with interest in the theory of design. The purpose is to provide an understanding of major theoretical ideas underlying design movements of the twentieth century. Explores these ideas through readings, lectures by faculty and visitors, student presentations of research papers, and seminar discussions.

899 Master’s Thesis and Research Fall or spring. Credits to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional.

Hours to be arranged. Department graduate faculty.

Human Development and Family Studies Courses


111 Observation Fall. 3 credits. Not open to first-semester freshmen.


An overview of methods of observing people and the settings in which they behave, in order to develop observational skills, increase understanding of behavior and its development, and acquire a practice in the fundamental methodological concepts underlying the scientific study of behavioral development. Direct experience in
applying observational methods in laboratory and field situations is emphasized. Discussion groups may accompany the observation experience.

115 Human Development: Infancy and Childhood Fall or summer. 3 credits. S-U grades optional. M W F 11:00-11:50. Condron.

Provides a broad overview of theories, research methods, and the status of scientific knowledge about human development from infancy through childhood. Attention is given to the interaction of psychological, perceptual, linguistic, neurophysiological, social, and cognitive development.


Consideration of history, theory, and methodology of family studies. Contemporary family roles and functions are examined from a life-course perspective.


A course giving an overview of basic research and theory on adolescence and cognitive development during adolescence and youth and how they affect an individual's personality and social development. Major issues discussed include the psychosocial significance of pubescence, the nature of adolescence as a point in the life course, and adolescent identity.


A course giving an overview of basic research and theory on an individual's personality and social development during adolescence and youth and how they affect an individual's personality and social development. The role of family, peers, school, and work contexts during adolescence is emphasized. Major issues discussed include autonomy, intimacy, achievement, and problem behavior.

218 Adulthood and Aging: Personality and Social Development Fall, weeks 1–2. 2 credits. Prerequisites: HDFS 115 or an introductory developmental psychology course and HDFS 150 or an introductory sociology course. Not open to freshmen. S-U grades optional. M W F 2:30. W. M. 230. Weekly discussion sections to be arranged. S. Corneilus.

This course provides a general introduction to theories and research on adult development and aging. Change and continuity in personality from youth through late adulthood are discussed. Transitions in familial and occupational roles and interpersonal relationships are examined from a life-course perspective.


This course provides a general introduction to theories and research on adult development and aging. The course emphasizes the study of cognitive changes during adulthood. Topics examined include physical health, disease, and longevity; issues in long-term care and institutionalization; and changes in cognitive processes such as perception, memory, thinking, and intelligence.

242 Participation with Groups of Children in the Early Years Fall or spring. 4 credits (3 credits with permission of registrar). Limited to 20 students (limit depends on availability of placements and of supervision). Prerequisite: HDFS 115. Recommended: HDFS 111 or Interdepartmental 100. S-U grades optional. W 10:10–12:05, plus 2 half-days of fieldwork (for 4 credits) or 1 half-day of fieldwork (for 3 credits). S. West.

A field-study course designed to combine experience in child-care centers with theory and supervision. Intended to develop the student's ability to understand and relate effectively to young children. Course structure integrates lectures and discussions, workshops, films, projects, reading, writing, and sharing of field experiences. Students are placed in local nursery schools, day-care centers, Head Start programs, and kindergartens.

243 Participation with Groups of Children Ages Six through Twelve Fall. 4 credits Limited to 20 students (limit depends on availability of placements). Permission of instructor required. HDFS 115. Recommended: HDFS 111. R 10:10–12:05, plus 2 half-days of fieldwork. P. Ziegler.

A field-study course structured to integrate knowledge from practice, lectures, discussions, and readings to provide a better understanding of child development in school settings. Each student will work in one classroom with an experienced teacher.

258 Historical Development of Women as Professionals, 1800–1980 (also Women's Studies 238 and Sociology 238) Fall. 3 credits. S-U grades optional. Human ecology students must register for HDFS 258.

A study of theories of creativity and a review of the social and institutional factors in changing behavior and shaping individuals' cognitive development.

267 Problematic Behavior in Adolescence Fall. 3 credits. Prerequisites: HDFS 216 or 217. Offered alternate years. Not offered 1987–88. M W F 9:05. Staff.

This course focuses on (1) various biological, psychological, and sociological theories that attempt to explain deviant behavior among adolescents; (2) research that addresses issues of problematic behavior; and (3) presentations by human services personnel and agencies concerning their programs and policies toward problematic adolescents. These will be integrated during class discussions.

333 Cognitive Processes in Development Fall. 3 credits. Prerequisite: HDFS 115 or equivalent. M W F 11: 15. Staff.

A survey of theories and problems in the development of selected cognitive processes: attention, perception, memory, thinking, and intelligence. The focus is on the first two years of life.

338 The Development of Creative Thinking Spring. 3 credits. Prerequisites: HDFS 115, Psychology 101, or Education 110. M W F 10: W. L. Britain.

A study of theories of creativity and a review of the research on creative behavior. Emphasis is on the conditions and antecedents of creative thinking.

346 The Role and Meaning of Play Spring. 2 credits. Limited to 30 juniors and seniors. Prerequisite: HDFS 115. Recommended: HDFS 111. W 7:30–9 p.m. J. Gebhardt.

The aim of this course is to examine the play of children ages three through seven. Through seminar discussions, workshops, films, and individualized research, the student will explore the meanings and validity of play in the lives of young children, the different ways that play can function and the value of each, and the effect of the environment in enhancing and supporting play.

347 Human Growth and Development: Biological and Social Psychological Considerations (also Biology and Society 347 and Nutritional Sciences 347) Spring. 3 credits. Prerequisites: Biological Sciences 101 or 109 or equivalent, and HDFS 115 or Psychology 101. Offered alternate years. Not offered 1987–88. M W F 1:25. J. Haas, H. Ricciuti.

A review of major patterns of physical growth from the fetal period through adolescence, with consideration given to biological and sociocultural determinants of growth, as well as to physical and psychological consequences of variations in growth patterns. Normal patterns of growth are examined, an analysis of major sources of variation in growth (normal and atypical) follows.

348 Advanced Participation in Preschool Settings Fall or spring. 3 or 4 credits. Prerequisites: HDFS 242 and permission of instructor. Recommended: HDFS 346. Two or 3 half-days participation (morning or afternoon) and an hour group conference each week. Staff.

An advanced, supervised fieldwork experience with a focus on helping children build relationships to support learning and personal development. Students are expected to define their own goals and assess progress with supervising teacher and instructor; to keep a journal; and to plan, carry out, and evaluate weekly activities for children in a variety of curriculum areas.

354 Families in Cross-cultural Perspective Fall. 3 credits. Prerequisites: HDFS 115 and HDFS 150 or Rural Sociology 100, or equivalent. S-U grades optional. M W F 11: 15. Staff.

The sociological study of families from a comparative perspective, looking at similarities and differences across cultures and across ethnic groups. A major focus is on the interdependence of the family system and social institutions.
Selective theories of the basic disciplines in social psychology, sociology, and psychology are reviewed and their understanding of adulthood is examined. Students generate hypotheses about these theories and test one of them through a paper based on either library or empirical research. A journal is kept to illustrate the concepts and to suggest practical applications.

[359] American Families in Historical Perspective (also Sociology 237, Women's Studies 237) Spring. 3 credits. Prerequisites: HDFS 50 or one 200-level social science or history course. S-U grades optional. Human ecology students must register for HDFS 359.
This course provides an introduction to and overview of problems and issues in the historical literature on American families and the family life cycle. Reading and lecture materials demonstrate the impact of American family experience in the past, focusing on class, ethnicity, sex, and region as important variables. Analysis of the private world of the family deals with changing cultural conceptions of masculinity, femininity, sex roles, generational relationships, stages of life, and life events. Students are required to do a major research paper on the history of their family, covering at least two generations, and demonstrate their ability to integrate life-course development, theory, data drawn from the social sciences, and historical circumstances.

[360] Personality Development in Childhood Spring. 3 credits. Prerequisites: HDFS 115 or Psychology 101, plus one other course in HDFS or psychology. Not offered 1987–88.
Study of relevant theoretical approaches to, and empirical findings regarding, the development of the child's personality. The influence of parents and other environmental factors on the child are examined. Topics covered include attachment, autonomy, identification, moral development, and social behavior.

Issues in the development of social behavior are viewed from the perspective of theory and research. An attempt is made to apply our understanding of social behavior to education, childrearing, and group behavior. Likely topics include bases of social behavior in early childhood, the role of peers, the development of aggressive behavior, the development and functioning of attitude and value systems, conformity and deviance, and the function and limits of experimental research in the study of social development.

[364] An Ecological Approach to the Study of Television Spring. 3 credits. Prerequisite: a developmental or psychology course; HDFS 115 or Psychology 101 preferred. S-U grades optional. Offered alternate years.
This course offers a historical and topical survey of the research literature regarding the influence of television. Topics include (1) the introduction of television from 1950 to 1960 and its direct effects, (2) the audience for television, (3) the content of television, (4) behavioral mechanisms of influence: imitation, disinhibition, arousal/desensitization, (5) the psychological research on television, (6) the cognitive mechanisms of influence, mainstreaming and resonance, formal features, comprehension, and perceived reality; current issues in research from 1980 on, the role of advertising, and multicopy design and the study they want to undertake, on a form available from the Student Services Office. This form must be signed by the instructor directing the study, the student's faculty advisor, and the appropriate section of Undergraduate Education (NG21 Martha Van Rensselaer Hall) and filed at course registration or within the change-of-registration period after registration. To ensure review before the close of the course registration or change-of-registration period, early submission of the special studies form to the Office of Undergraduate Education is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study (guidelines for each are available in NG21 Martha Van Rensselaer Hall).

[371] Behavioral Disorders of Childhood Fall. 3 credits. Prerequisites: Psychology 101 or Education 110, and an introductory personality development (such as HDFS 270 or an equivalent). Not offered 1987–88.
Considers the psychological disorders of childhood ranging from transient adjustment reactions to psychoses. The disorders will be studied in view of theories regarding etiology, treatment, and primary prevention.

This course provides an intensive historical examination of both normal and abnormal intelligence, focusing on the antecedents of contemporary views of the inheritability of intelligence, brain-behavior linkages, expertise, generalization, and cognitive modifiability.

[380] Aging and Health Fall. 3 credits. Prerequisites: HDFS 216 and 219 and Biological Sciences 109–110 or equivalent.
M W F 9:05. J. Harding.
General introduction to health problems of the elderly and arrangements for health care with them. The course discusses normal biological changes with advancing age, major age-related diseases, the American healthcare system, and the use of health services by the elderly. Some attention is given to health care for the elderly in other Western societies and to current policy issues in the United States.

[397] Experimental Child Psychology Fall. 4 credits. Prerequisites: one course in statistics and permission of instructor. Intended primarily for students interested in entering graduate programs involving further research training.
Special topics to be arranged. L. C. Lee.
A study of experimental methodology in research with children. Includes lectures, discussions, and practicum experiences covering general experimental methodology, statistics, and styles and strategies of working with children.

[398] Junior Honors Seminar Spring. 2 credits. Permission of the coordinator of the honors program required for registration. Enrollment limited to students in the honors program.
Reports and discussion of research and selected thesis topics by faculty and honors students.

[400]—401—402—403 Special Studies for Undergraduate Students Spring. 3 credits. Prerequisite: faculty approval. Credits to be arranged. S-U grades optional.
Hours to be arranged. Department faculty.
For advanced independent study by an individual student or for study on an experimental basis with a group of students in a field of HDFS not otherwise provided through course work in the department or elsewhere at the university. Students prepare a multicopy design and the study they want to undertake, on a form available from the Student Services Office. This form must be signed by the instructor directing the study, the student’s faculty advisor, and the appropriate section of Undergraduate Education (NG21 Martha Van Rensselaer Hall) and filed at course registration or within the change-of-registration period after registration. To ensure review

[414] Policies and Programs for Adolescents Spring. 3 credits. Prerequisites: HDFS 216 and 217, or permission of instructor. Not offered 1987–88.
Plans and practices intended to foster adolescent development are examined in the light of needs identified by theory and research. The key question is how societal and governmental institutions support or hinder the transition of adolescents to adulthood. Current issues, especially secondary school reform and youth employment, provide focal points for examining actual and proposed policies and programs. The course also addresses the nature of social policy and its relation to social science.

[431] Learning in Children Fall. 4 credits. Prerequisite: HDFS 115 or equivalent. Not offered 1987–88.
T 10:10–12:05. Field experience to be individually arranged. M. Potts.
Consideration of the theoretical and research literature in processes of learning, includes the interrelations of learning and development and of learning and intelligence. Examines theories and models of learning as well as variables that affect the learning process. Application is made to the assessment of cognitive and social learning through laboratory and fieldwork.
432 Cognitive Development and Education
Spring. 3 credits. Prerequisite: HDFS 115 or equivalent.
T 10:10–12:05; field experience to be individually assigned. M. Lust.
This course defines basic cognitive processes that underlie education (for example, linguistic processes that underlie language comprehension and production; numerical processes that underlie mathematics; and perceptual processes that underlie reading) and reviews basic and current research on the development and learning of these processes in young children. In addition, the course examines theories of development for various approaches to education (for example, the relevance of Piagetian developmental theory to standard and alternative educational models). A laboratory component focuses on assessment and facilitation of cognitive development as it bears on one educational subject.

434 The Growth of the Mind: Piaget's Theory of Cognitive Development
Spring. 4 credits. Open to undergraduate and graduate students. Prerequisite: HDFS 115 or equivalent. S-U grades optional. Offered alternate years. M. W. F 1:25. B. Lust.
An introduction to basic issues and research in cognitive development, intended to provide students with a basic and critical knowledge of the development of human cognition. The course is taught as a framework for the review. The course reviews research on the development of object permanence and on the development of logical, numerical, and scientific thinking. Research on representation through mental imagery and language is also discussed, as are current attempts to extend Piagetian theory to educational practice. Recent research in those areas is considered throughout as a supplement and contrast to Piaget's theory. (A laboratory, HDFS 435, in Piaget's "clinical method" is possible.)

436 Language Development (also Psychology 436 and Linguistics 436)
Spring. 4 credits. Prerequisite: at least one course in developmental psychology, cognitive psychology, cognitive development, or linguistics. S-U grades optional. Offered alternate years. Not offered 1987–88.
T R 10:10–12:05. B. Lust.
A survey of basic issues, methods, and research in the study of first-language acquisition. Major theoretical positions in the field are considered in the light of experimental studies in first-language acquisition of phonology, syntax, and semantics from infancy on. The fundamental issues of relationships between language and thought, and the relationship between the fundamental linguistic universals of Universal Grammar and the biological foundations for acquisition. The acquisition of communication systems in nonhuman species such as chimpanzees are addressed, but major emphasis is on the child.

437 Creative Expression and Growth
Fall. 4 credits. Limited to 25 students. May be added during first week only.
T R 10:10–11:30. Saturday mornings should be free to provide time for participation with children. W. L. Brittain.
Aimed at an appreciation and understanding of the creative process in art, music, dance, and drama in relation to the development of children.

438 Thinking and Reasoning
Fall. 3 credits. Prerequisite: HDFS 115. W 2:30–5:00. R. Kowalski.
The course will examine the areas of logical thinking (in formal as well as real-world contexts), the process of making logical and "natural" inferences, causal reasoning, and scientific reasoning. Two general issues will run through the course, the extent to which children and adults approximate the sorts of reasoning that are described by various types of models, and the extent to which various models account for the kinds of thinking that result from the types of problems and issues that arise and must be dealt with in the real world.

440 Internship in Cornell Nursery School
Fall or spring. 10–12 credits. Prerequisites: HDFS 115 and 242. Recommended: HDFS 346 and 348. Permission of instructor required. M. F. B-1 or 10:30–4:30. Staff.
Internship in Cornell Nursery School. Opportunity to integrate theory with practice and to develop understanding of the child who is at risk and their families. Placement as assistant teacher in the morning or afternoon program and participation in curriculum planning, evaluation, staff meetings, home visits, parent conferences, and parent meetings. Supervision by head teacher and director.

456 Families and Social Policy
Fall. 3–4 credits. Limited to 20 juniors in the area of the family or in sociology. S-U grades optional. Hours to be arranged. P. Moen.
An examination of the intended and unintended family consequences of governmental policies, using case studies in areas such as social welfare, day care, and employment. The policy implications of changes in the structure and composition of families are also considered.

464 Developmental Theory and Research on Homosexuality
The course will address a sensitive and controversial subject in a scientific fashion. The theoretical and empirical literatures that focus on the development and maintenance of a homosexual identity, homosexual behavior, and cultural responses to homosexuality will be covered. Although the issue, homosexuality, is specific, it reflects the larger issues of sexual identity, personality/social development, and environmental and biological influences on human development. The time span considered is not limited to a specific developmental sequence; it reflects a life-course perspective, moving from conception through the infant, toddler, childhood, and adolescent years to adult identity and behavior. A major research paper on a topic selected by the student is required.

481 Introduction to Ecological Psychology
Spring. 3 credits. Limited to graduate and upper-division undergraduate students. Prerequisite: permission of instructor. Letter grades only. T R 2:30–4:25. P. Schoggen.
A broad survey of the theory, concepts, methods, and empirical research in ecological psychology, the study of the effects of the environment on the naturally occurring molar environment of everyday life. The first part of the course examines the problem of observing, recording, and analyzing the continuous stream of individual behavior under natural conditions, with special concern for child behavior and development. The rest of the course is devoted to the study of behavior settings, the immediate environmental contexts of molar human behavior. We will be particularly concerned with the usefulness of behavior settings in empirical studies of person-environment interaction at all stages of the life course from infancy through old age. A course description with typical readings is available from the instructor.

485 (01) Human Development in Post-Industrialized Societies
Spring. 4 credits. Not offered 1987–88. Enrollment limited to 20 juniors and seniors from various schools and colleges. This is one of a series of Common Learning Courses specially designed to contribute to general education at the upperclass level. Each course focuses on a topic of significance to contemporary society and has been developed by a faculty team from different disciplines, with one instructor taking primary responsibility for the integration and teaching of the course. T R 2:30–4:25. U. Bronfenbrenner.
The course analyzes the implications for human development of the profound economic, technological, and social changes that have been taking place in modern societies. Particular emphasis is placed on the effect of these changes on the family; health, child care, and social services; the school; the workplace; the community; and the relations between these domains as they influence processes of biological and psychological development throughout the life course. The topic will be treated from the perspective of several relevant disciplines, including economics (Robert H. Frank), developmental psychology (Steve Ceci), social anthropology (Robert J. Smith), human biology (Virginia Utermohlen), sociology (Phyllis Moen), and the law (Peter W. Martin).

488 Development in Context (also Psychology 488)
Spring. 4 credits. Open to juniors, seniors, and graduate students. Prerequisites: one course in statistics and two courses in social sciences, or one in human biology and one in social sciences. T R 2:30–4:25. U. Bronfenbrenner.
The course presents a systematic examination of existing research on human development throughout the life course in the actual environments in which people live. Attention is focused on the interplay between biological and environmental influences. These influences derive both from the immediate settings containing the developing person and the larger cultural and historical context in which they are embedded. Implications are drawn for public policy and practice.

498 Senior Honors Seminar
Fall. 1 credit. Required for, and limited to, seniors in the HDFS honors program. W 2:30. P. Schoggen.
This seminar is devoted to discussion and presentation of honors theses being completed by the senior students.

499 Senior Honors Thesis
Fall or spring. Credit to be arranged. Prerequisite: permission of thesis adviser and coordinator of honors program. S-U grades optional. Department faculty.

Topics Courses
Fall or spring. 2–4 credits. Prerequisites and enrollment limits vary with topic being considered in any particular term. Permission of instructor required. Hours to be arranged. Department faculty.
This series of courses provides an opportunity for advanced undergraduates to explore an issue, a theme, or research in the areas of departmental concentration. Topics vary each time the course is offered. Descriptions are available at the time of course registration. Although the courses are usually taught as seminars, a subject may occasionally lend itself to lecture, practicum, or other format.

415 Topics in Adolescent Development

435 Topics in Cognitive Development

445 Topics in Early-Childhood Education and Development

455 Topics in Family Studies

465 Topics in Social and Personality Development

475 Topics in Atypical Development

485 Topics in the Ecology of Human Development

The Graduate Program

HDFS graduate courses are only open to undergraduates with instructor's permission.

General Courses

617 Adolescence
Spring. 3 credits. Hours to be arranged. D. Blyth.
Critical examination of some seminal theoretical writings on adolescent development, along with recent
work relevant to intellectual development, ego development, and social development during early and late adolescence. Empirical research on specific questions chosen by students is considered in the light of these approaches.

631 Cognitive Development Fall. 3 credits. Letter grades only. Offered alternate years. Not offered 1987-88. R: 1:30–4:30. W. L. Brittain, S. Ceci, S. Connell. B. Koslowski, B. Lust, M. Potts, G. Suci. Faculty members involved in the course will present their area of specialization in cognitive development. These areas will include perception, attention, memory, language, thinking and reasoning, learning, creativity, and intelligence.

640 Infancy Fall. 3 credits. R 10–12. H. Recuci. Critical review of major issues of contemporary concern in the field of infant behavior and development, based on readings of selected research papers and review articles. The overall intent is to develop an analytic understanding of where the field stands at present with respect to various topical issues and to identify directions for future research.


650 Contemporary Family Theory and Research Fall. 3 credits. T Th 9:30–12. P. Menn. The uses of sociological theories and research in the study of the family are studied with particular reference to the relationship between the family and society and between the family and its individual members.

651 Family Theory and Research 1865–1965: Sociological and Historical Perspectives Spring. 3 credits. Offered alternate years. Hours to be arranged. Staff. This course provides a foundation in family theory and research from the inception of the scientific study of families in the nineteenth century through 1965. Students will read classic papers and major monographs in the field, drawing from the disciplines of anthropology, demography, history, psychology, social psychology, and sociology. The major emphasis is on work in sociology.

660 Personality and Socialization Spring. 3 credits. Not offered 1987–88. Hours to be arranged. J. Condy. Major issues in personality development and socialization, with special emphasis on theoretical models and empirical issues.

670 Abnormal Development Fall. 3 credits. Prerequisite: an undergraduate course in abnormal psychology or psychopathology. Hour to be arranged. Staff. Overview of current theories and empirical research on functional and organically based psychological disorders. Topic areas to be covered include autism, schizophrenia, neuroses, and personality disorders. Focus is on developmental aspects of abnormal behavior.

Topical Seminars

Seminar offered irregularly, with changing topics and instructors. Content, hours, credit, and instructors to be announced. Seminars offer concentrated study of specific theoretical and research issues.

618 Seminar in Adolescence Topics include peer relations, parent-teen relationships, self-esteem, youth and history, work, and moral development.

633 Seminar on Language Development Topics include acquisition of meaning in infancy, precursors of language in early infancy, and atypical language development.

635 Seminar in Cognitive Development Topics include early attention, perception, memory, and communication. Assessment and intervention in relation to these processes will be considered when possible.

645 Seminar on Infancy Topics covered in depth include the role of emotions in early development, infant stimulation and early experience, and the assessment of infant developmental competencies.

646 Seminar in Early-Childhood Education Topics include analysis of models and settings, design of assessment techniques, program evaluation, and early childhood in a cross-cultural context.

655 Seminar in Family Studies Topics include the sociological status of single-parent families, family-work-family linkages, women and work, and families and social change.

665 Seminar in Personality and Social Development Focuses on selected issues related to personality and social development. The issues selected vary each year according to current importance in the field and student interests.

675 Seminar in Developmental Psychopathology Topics include learning disabilities, therapeutic interventions in atypical development, childhood abuse and maltreatment, family factors in the etiology of functional disorders, and cognitive characteristics of atypical groups.

685 Seminar in Human Development and Family Studies Topics include development of self-concept, ego identity, observational, social, and language development.

700–706 Special Studies for Graduate Students Fall or spring. Credits and hours to be arranged. S-U grades only. Instructor. Department faculty. Independent advanced work by graduate students recommended by their Special Committee chairperson with approval of the instructor.

700 Directed Readings For study that predominantly involves library research and independent study.

701 Empirical Research For study that predominantly involves collection and analysis of research data.

702 Practicum For study that predominantly involves field experience in community settings.

703 Teaching Assistantship For students assisting faculty with instruction. Does not apply to work for which students receive financial compensation.

704 Research Assistantship For students assisting faculty with research. Does not apply to work for which students receive financial compensation.
facilitate human growth and development. The course includes an overview of educational programs that use human ecology content in selected human services delivery systems and settings. Emphasis is placed upon the competencies and responsibilities of professionals assuming the educative role.

246 Ecological Determinants of Behavior Fall. 3 credits. Prerequisites: introductory sociology and psychology and human development course.
M W F 2:30-3:20, J. Muller.
Compares conceptual models of human behavior, encouraging the student to incorporate an ecological model into his or her personal-professional framework. Introduces ecological sociological techniques in social problems and professional practice in human services and social work in particular. The ecological-systems approach embodies holistic philosophy and concern with special arrangement for course "fit" between people and environments. Emphasis on bio-psycho-social functioning of the person-in-situation and valuing human diversity.

280 Racism in American Society Fall. 3 credits.
The purpose of this course is to explore the historical, political, and social ramifications of racism in American society. A major goal will be to understand the presence and persistence of racial inequality and the relationship of human services to the problems of racism.

292 Research Design and Analysis Fall. 3 credits.
W 7:30-10 p.m. C. McClintock.
Students should develop skill in analyzing and evaluating research reports. Readings and periodic assignments and exercises focus on stating hypotheses, designing studies to test hypotheses, measuring variables, and interpreting findings.

300 Special Studies for Undergraduates Fall or spring.
Credit to be arranged.
Hours to be arranged. Department faculty.
Special arrangements for course work to establish equivalency for training in a previous major or institution. Students prepare a multiplicity description of the study they want to undertake on a form available from the Student Services Office. This form will be reviewed by both the instructor directing the study and the head of the department, should be filed at course registration or during the change-of-registration period.

315 Human Sexuality Fall, spring, or summer.
3 credits. Prerequisite: an introductory course in human development and family studies, psychology, or sociology (or equivalent social science course).
Recommended: one course in biology, S-U grades optional.
Fall, T R 1:25, spring, W 7:30-10 p.m., sec to be arranged. A. Parrot.
The aim of this course is to provide students with an understanding of the interactions and relationships of human behavior that influence sexual development and behavior. There will be a social policy orientation focusing on the evolution of sexual norms, customs, and legislation within changing sociopolitical systems. Biological developmental components of human sexuality will be addressed. An underlying issue is the influence of our social and cultural system on the development of sexual needs, standards, and values. Research and theory in human sexuality will be explored in an interdisciplinary approach drawing on human and organizational behavior, biology, history, communication arts, education, research theory, law, sociology, and psychology.

325 Health-care Services and the Consumer Fall. 3 credits. S-U grades optional. Not offered 1987-88 or 1989-90.
T R 10-11. 15. A. Parrot.
Developments in the health field that affect the availability and kinds of health services. Emphasis is placed on interrelationships between institutions and agencies and the part each can play in prevention, diagnosis, and treatment of disease and disability. Focus will include historical and current trends, quality health care, consumer issues, ethical issues, politics and policies, and the problems of health care.

330 Ecology and Epidemiology of Health Fall. 3 credits. S-U grades optional. Offered alternate years.
Next offered 1988-89.
T R 2:30-3:45, A. Parrot.
Ecological and epidemiological approaches to the problems of achieving human health within the physical, social, and mental environment. The course introduces epidemiological methods to the students and surveys the epidemiology of specific diseases such as AIDS, hepatitis, Legionnaires' disease, plague, cancer, and herpes.

339 Ecological Approach to Instructional Strategies Spring. 3 credits. Limited to 20 students. Priority given to HSS majors.
T R 10-12:05, D. Barr.
A laboratory course providing theoretical frameworks for observation, analysis, and practice of various teaching behaviors and their effects on learners. Similarities and differences in teaching youths and adults are explored and the influences of the settings are considered. Students select age groups and settings in the community in which to use process, teaching, and interaction strategies. To facilitate learning, these are videotaped and critiqued. Observations of schools or community learning activities are arranged.

340 The Politics of Public Budgeting Fall. 3 credits.
M W 3:35, and section to be arranged. R. Buchanan.
The course examines the theory and practice that have developed to plan and control raising and spending public funds. The study of public budgeting includes the examination of techniques for controlling spending and methods for raising revenues. Because these fiscal decisions are made in a political environment, the course will take a multidisciplinary approach, synthesizing both the political and economic aspects of budgeting. Students will assume the roles of the different actors in the budgetary process to learn both the institutional dynamics of the process and the political constraints involved.

370 Social Welfare as a Social Institution Fall. 3 credits.
A philosophical and historical introduction to social welfare services. The course reviews the social context of the development of social welfare programs. Basic issues in welfare are discussed in the context of present program designs, public concerns, and the interpersonal relationships and support of services in the community.

400–401–403 Special Studies for Undergraduates Fall or spring. Credits to be arranged. S-U grades optional.
Hours to be arranged. Department faculty.
* For independent study by an individual student in advanced work in a field of HSS not otherwise provided in the department or elsewhere at the university, or for study on an experimental basis with a group of students in advanced work not otherwise provided in the department or at the university. Students prepare a multiplicity description of the study they want to undertake on a form available from the Counseling Office. This form must be signed by the instructor directing the study and the department chairman and filed at course registration or within the change-of-registration period. To ensure review before the close of the course registration or change-of-registration period, early submission of the special-studies form to the chairman is necessary. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study:

400 Directed Readings
For study that predominantly involves library research and independent readings.

401 Empirical Research
For study that predominantly involves data collection and analysis or laboratory or studio projects.

403 Teaching Apprenticeship
Prerequisite: Must have completed the course (or equivalent) in which they will be assisting and have demonstrated a high level of performance. For study that includes assisting faculty with instruction.

411 Introduction to Adult Education (also Education 482) Fall. 3 credits. Limited to 45 students. S-U grades optional.
T R 12:20–2:15, D. Deshler.
Focuses on broad aspects of adult education, scope and history of adult-education programs, philosophy and principles, perspective of the adult learner, media and methods of instruction, and program development. Opportunities are provided for observation of adult-education programs in community organizations and agencies.

414 Professional Internship in Human Service Studies Fall or spring. 6–9 credits. Limited to juniors and seniors majoring in HSS.
Department faculty.
A structured experience for students to assume a professional role and responsibilities under the guidance of a preceptor in a community-service organization. Conferences involving the student, field preceptor, and college supervisor are arranged in a block, scheduled throughout the semester, or completed in the summer session, depending on the nature and location of the student's fieldwork.

416 The Helping Relationship Spring. 3 credits.
Each section limited to 20 students. S-U grades optional. Offered Alternate years. Next offered 1989–90.
T R 10–12:05, D. Barr.
A critical analysis of the meaning of help in American society from the perspectives of power, alienation, sexism, and racism.

W 7:30–10 p.m. D. Barr.
The framework of the course will take an analytical worldview with some understanding of a capitalist political economy and the historically colonial relationships between the American ruling class and peoples of color, the poor, and the powerless. In addition, the course will analyze the effects of these structural and historical facts on people's lives today. The relationship between a classed, racist, and sexist society and the human services will also be included by exploring the nature of empowerment. The course will focus systematically on both macro and micro levels.

441 Preparation for Internship in Human Ecology Education Fall, weeks 1–7. 2 credits. Limited to students completing human ecology education requirements. Prerequisites: HSS 339 and 202 (if taken prior to fall 1986, HSS 439 may be substituted for HSS 202). To be taken concurrently with HSS 442 and 443. May involve some expense for field visits. Offered for the last time in 1987–88.
T R 10:10–12:05, plus hours to be arranged during independent study week. M. Minot.
An orientation for the internship in education. Major topics to be covered are development of learning environments, evaluation of the teaching-learning processes in relation to personal goals and unit objectives, philosophy, creativity and teaching techniques, professionalism, and networking. Selected materials for the internship will be developed.
471 Social Work Practice II  Spring, 9 credits. Limited to 25 social work students. Prerequisites: grades of B– or better in HSS 471 and satisfactory performance in fieldwork.

473 Section 01 Senior Seminar in Social Work  Spring, 3 credits. Prerequisites: HSS 471–472. (HSS 472 may be taken concurrently.)

473 Section 02 Senior Seminar  Fall and spring. 3 credits. Prerequisite: Field work or permission of instructor. Limited to 18 junior and senior HSS majors. Fall T 2:30–4: L. Street. Spring, T R 12:20–2:15. A. Hahn.

475 Social Policy  Spring, 3 credits. Prerequisite: HSS 370 or Government 111 or Sociology 141. 5 U-grades optional. Students should have field or work experience in a human-service program before or while taking this course.

477 Comparative Health-Care Systems: Canada, the United States, and Third World Countries  Fall. 3 credits. Open to all juniors and seniors. Offered alternate years. Next offered 1988–89.

An overview of health services is given within the larger context of the social and economic development policies of Canada, the United States, and third world countries. Socio-cultural, economic, and managerial factors are stressed as keys to the formulation of realistic strategies. Resource allocations for health services are assessed against the backdrop of changing rates of economic growth. The relevance of high-technology solutions in developing countries is examined.

628 Medical-Service Issues in Health Administration  Spring. 3 credits.

629 Strategic Planning and Marketing in Health Care  Spring. 3 credits.

The course is designed for students interested in the strategic planning process who may be pursuing careers in health-care management, health planning, and management consulting. It attempts to integrate and apply students’ knowledge, skills, and analytical abilities in the planning and implementation of health services at the institutional level. The strategic planning process is viewed as an essential part of corporate management, a dynamic endeavor that enables organizations to cope with change and meet community health-care needs in an increasingly competitive environment. Useful concepts and methods for assessing internal and external opportunities are stressed. Cases, visiting discussion leaders, and student reports help to focus and synthesize the course sessions and materials. The cases include analyses of organization and strategies for planning, environmental assessment, marketing approaches, political strategy formulation, diversification and corporate restructurings, and hospital systems.

631 Primary Health-Care Services: Policy and Planning  Spring. 3 credits. 5 U-grades optional.

Part one of the course concentrates on techniques for estimating supply requirements for personnel and facilities. In part two the consumer-behavior literature is reviewed with respect to the interpretation of disease and the exercise of choice in the initiation of first-contact medical care. The organization of primary health-care services is described in part three. Some of the topics include health-care financing, economic factors, health insurance, third-party payment, managed care, private group practice, and health maintenance organizations. The remainder of the course provides a critique of community power structure theory and popular models for managing social change.
and other regulatory agencies in the negotiation process. Students work with current actual cases and materials. Films are also used. Students have the option of taking a final examination or submitting a short research paper.

633 HMO Development and Management

Spring. 1 credit.
W 4–6:30 (course meets for 5 sessions only).
F. Yaman.
The major goal of this course is to provide students with the conceptual framework for understanding the role of health maintenance organizations (HMOs) in today's health economy and to provide an introduction to the planning, development, and operation of HMOs.

635 Field Studies in Health Administration and Planning

Fall or spring. 1–4 credits.
Hours arranged. D. Brod.
Students interested in developing administrative and program-planning research skills are given an opportunity to evaluate an ongoing phase of health care agency activity in the field. Close contact with actual practicing and principles of good medical care. In planning and carrying out the research, students work closely with a skilled practicing administrator and with members of the school’s faculty.

636 Financial Management of Health and Human Service Organizations

Spring. 3 credits.
Prerequisite: a financial accounting course or permission of instructor.
T 12:20–2:15.
R. Buchanan.
The purpose of the course is to provide students with a basic understanding of the financial aspects of managing health and other human service organizations. The course will focus mainly on healthcare organizations, but it is expected that much of the content will be applicable to other human service agencies. It begins with a review of financial information in health care, rate setting, and capital management. The middle section of the course deals with budgeting and inventory management, and the last part discusses problems and trends in hospital financing.

[652 Preparing Professionals in the Human Services

Spring. 3 credits. S-U grades optional. Offered alternate years. Next offered 1988-89.
T 10:10–11:25.
M. Minot.
Students analyze the assumptions and concepts that underlie professional and continuing professional education for volunteers, paraprofessionals, and professionals in the human services (for example, adult and continuing education, health, human services, and social work education). A variety of preservice and in-service programs will be analyzed in terms of goals, means of implementation, and evaluation. Factors that influence programs are examined, including educational setting, licensure, accreditation, legislation, evaluation of performance. Students have opportunities to participate in educational programs in human service professions and community organizations. Students may develop or modify a model for providing professional education at the preservice or in-service levels.]

653 Consulting and Supervisory Roles in Human Services

Spring. 3 credits. S-U grades optional. Offered alternate years.
T 10:10–11:25.
M. Minot.
Analysis of theories and practices of consulting and supervision and their application in higher education and in human service agencies at the national, state, and local levels. Students make observations and apply consulting and supervisory skills in settings related to their professional goals.

660 Public Policy and Program Planning in Human Services

Fall. 3 credits. S-U grades optional.
M W Th 11:30–12:30.
J. Allen.
A review of the public policy process in education, health, and social welfare services as it pertains to program development. The course includes the history, definitions, and boundaries of the policy process; the relationships of the policy process to political economy, social structure, intergovernmental relations, and cultural values and beliefs; theories of planning and program development in human services; the role of evaluation in program planning and implementation, with special emphasis on monitoring and feedback of effects into the policy and planning process; selected current issues in policy and planning processes, such as regulatory and legislative constraints; the responsibilities of clients or consumers and professional planners and providers; and problems and prospects in the coordination among the various human services.

661 Designing and Implementing Human Service Programs

Spring. 3 credits. S-U grades optional. Offered alternate years.
M 7–10 p.m. L. Streit.
Examine the procedures of designing and implementing human service programs with a focus on designing programs to fit communities, groups, and individuals and attendant issues of implementation, such as demands placed upon a program's staff, an organization's roles in the community, competing for clients and other resources, working in the context of community systems, conflict management, and negotiation. Emphasis is placed on formulating specific program designs through the political context of the local community, gaining support for a program, and dealing with conflicting proposals and regulatory aspects of service delivery. The course stresses the need to develop programs for underserved segments of the community and the equal-opportunity implications of program design and implementation.

664 The Intergovernmental System and Human Service Program Planning

J. Staff.
An in-depth review of intergovernmental systems in America and their relevance to the formulation of human service policy and programs. Issues of decision making, fiscal arrangements, and public/private sector arrangements are explored as they are affected by intergovernmental relationships. The course provides students with an analytic framework for understanding those other issues that review the relationships within and between various governmental levels.

665 Human Service Politics in the Local Arena

Spring. 3 credits.
T 10:10–11:25.
A. Hahn.
This seminar investigates policy making in the local political arena, with special reference to human service programs and issues. Topics include community power; the behavior of administrative personnel, business leaders, state and federal governments, and other participants in local decision making; and citizen participation, with special reference to social movements and social movement organizations. Implications for both practice and research will be emphasized.

690 Measurement for Program Evaluation and Research

Fall. 3 credits.
T 10:10–11:25.
J. Greene.
The course reviews measurement theory and its application to the evaluation of human service programs. Topics include validity; reliability; scaling methods; basic principles of instrument design; and methods of data collection, including interviewing strategies, testing, self-reports, observation and content analysis, and data coding. Attention is given to issues such as ethical and managerial concerns that arise in applied settings.

691 Program Evaluation and Research Design

Spring. 3 credits. Prerequisite: introductory statistics course strongly recommended.
T 12:20–2:30.
J. Greene.
Introduction to the theory of research design and its application to the evaluation of human service programs. Major topics include experimental, quasi-experimental, cross-sectional, and exploratory research designs, basic sampling theory, and use of qualitative and quantitative methods. Attention is given to issues that arise in the application of research designs to the evaluation of programs, including problems of randomization, causal inference, replication, and utilization of results. Skills covered include sampling and testing hypotheses, critical analysis of research reports, computer simulation, and development of a research proposal.

692–693 Program Evaluation in Theory and Practice

692. Fall; 693. Spring. 4 credits each semester.
Prerequisites for HSS 692: 690 and 691, or permission of instructor. Prerequisite for HSS 693: 692. Students must register for both semesters. Offered alternate years.
T 2:30–3:45.
J. Streit.
A two-semester practicum in which the class designs and conducts a program evaluation in the human services. Students are involved in all phases of the evaluation from design through the production and dissemination of a final report. Emphasis is on research methods in the social sciences. Application of knowledge developed in prerequisite courses is stressed (for example, planning and managing an evaluation, ethics, methods of data collection, data processing, and strategies for analysis and feedback of results).

[695 Strategies for Policy and Program Evaluation

Fall. 3 credits. Prerequisites: HSS 690 and 694 or equivalent. Offered alternate years. Next offered 1988–89.
T 2:30–3:45.
J. Greene.
This course will explore the wide range of approaches to the evaluation of policies and programs in the human services. Traditional social science methods are reviewed as well as investigative and evaluative methods from other disciplines (e.g., auditing, law, history, criminology, philosophy). Analysis of the common and divergent tactics among different approaches to evaluation will be used to judge the appropriateness of a given strategy for a particular type of setting.]

696 Qualitative Methods for Program Evaluation Spring. 3 credits. Prerequisite: HSS 690 and 694 or equivalent. Offered alternate years. Next offered 1988–89.
T 1:25–2:40.
J. Greene.
This course explores the issues related to qualitative research methodology and the evaluation of human service programs. Topics include the underlying epistemological assumptions, questions of entry into setting, data collection, data analysis procedures, and the ethics of qualitative research approaches. It is the aim of the course to identify those settings and researchable questions where such a methodology is most appropriate.

704–705 Internship in Human Service Studies

Fall, spring, or summer 1–15 credits. S-U grades optional. Hours to be arranged. Graduate faculty.
Internship placement in human services is determined by availability and students’ academic and professional goals. Opportunities are available in public and private human service organizations at the national, state, and local levels in positions consistent with students’ needs and desires. The duration of an internship is negotiated between the student and the agency, while course credit and residence units are arranged between the student and the Special Committee.

790 Advanced Seminar in Program Evaluation

Spring. 3 credits. S-U grades optional. Prerequisite: permission of instructor.
T 9:10–10:15.
J. Greene.
Intended for students with competence in program planning and program evaluation (equivalently at least one course of the HSS 660 series and three of the HSS 690 series) and in statistics through multiple regression. The seminar focuses on analysis and appraisal of current literature on program evaluation and evaluative research, with emphasis on the links...
between program evaluation and program planning and administration. Attention is given to two or more service areas (education, health, social welfare) and to applications across those areas.

899 Master's Thesis and Research Fall and spring. Credit to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional. Hours to be arranged. Department graduate faculty.

999Doctoral Thesis and Research Fall and spring. Credit to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional. Hours to be arranged. Department graduate faculty.

Topical Seminars and Practicums

Seminars and practicums, offered periodically and as faculty projects, focus on professional issues in evaluation practice, including consulting, ethics and faculty projects. Content, time, credits, and instructors to be announced. Seminars and practicums offer concentrated study in a specific human service area or in the educational, planning, or evaluation processes within human services.

613 Seminar in Health and Mental Health Services Topics include drug problems, developments in health and mental health policy and planning, and community mental health services.

669 Seminar in Program Planning and Development Fall. Hours to be arranged. Staff. Topics include microlevel program planning, third-sector organizations, and intergovernmental influences on program planning, program evaluation, and mainstreaming. Two or more human services are examined.

699 Seminar in Program Evaluation and Evaluative Research Fall and spring. W 12:20–1:10. C. McClintock. The seminar is topically organized according to student and faculty projects. Focuses interest with changing topics and instructors. Content, time, credits, and instructors to be announced. Seminars and practicums offer concentrated study in a specific human service area or in the educational, planning, or evaluation processes within human services.

Continuing Education for Professionals

These courses are not a part of the department's regular graduate offerings but are designed to provide continuing education for professionals through the extramural division.

507–508 Professional Improvement I and II Fall, spring, or summer. 3–6 credits. Enrollment is determined by various factors, including nature of content, funding, resources, facilities, and instructor. S-U grades optional. Intended for extramural (evening) and off-campus instruction. May be repeated with the permission of the instructor. A series of special-problem seminars, classes, and activities designed for in-service and continuing education of practitioners in helping professions, such as home economics teachers, social workers, public health planners, and adult educators. Specific content of each course varies with group being served but includes work and class time appropriate to number of credits.

Textiles and Apparel Courses


040 Apparel Studio Fall. 1 credit. Limited to 12 students; open to TXA majors or students transferring into TXA. Minimum cost of materials, $35; lab fee, $5. Lec. F 8–9:55; A. Racine. An introduction to the concepts of shaping, reinforcing, joining, and detailing textile materials and the variety of apparel forms. A remedial course to help students reach the level of proficiency in construction skills necessary for further study in apparel design.

135 Introduction to Textiles Fall. 3 credits. Each lab limited to 15 students. Prerequisite or corequisite Chemistry 103 or 207. Maximum cost of supplies and tools. Lecs. T 1:25–2:15; lab. T 2:30–4:25, R 2:30–4:25, or F 1:25–3:20. A. Netravali. An introduction to the basic properties of textile materials, with consideration of their technology, characteristics, and economic importance. Behavior of textile materials is observed in a variety of environmental conditions that influence aesthetics, comfort, and performance. This course is designed to provide a basis for further study in textiles, but it also contains sufficiently broad coverage of the subject to be used as an elective course.

145 Apparel Design I Spring. 4 credits. Limited to 14 students; priority given to TXA majors or students transferring into TXA. Prerequisite: TXA 400 or basic sewing skills recommended. An art or drawing course. Apparel design requires a course during the first year. Minimum cost of materials, $80; lab fee, $10. Lecs and labs, M W F 12:20–2:15; A. Racine. Intensive study of principles and processes of flat pattern design and fitting techniques, with emphasis on development of creative expression in fashion apparel.

146 Clothing: The Portable Environment Fall. 3 credits. Average cost of materials, $25; lab fee, $10. Lec. T 10:10–11:40; S. Watkins. An introduction to the physical function of clothing for individuals of varying ages, for sports and recreation, for the physically handicapped, for historical, and other aspects of international trade of textile and clothing. Minimum cost of materials, $30; lab fee, $10.

238 Textiles for Interiors and Exteriors Fall. 3 credits. S-U grades optional. M W F 9:05. Staff. This course reviews developments and trends in textiles for homes and for contract interiors. Consideration is given to end-use requirements, to performance and test standards and specifications, and to the environments in which these textiles are used. Field trips are arranged when feasible.

241 Assessment of Product Quality Fall. 3 credits. Each section limited to 15 students. Lec. M 10:10; Sec, W 10:10–12:05 or F 10:10–12:05. A. Racine. Lectures and discussions will focus on analyzing the quality of sewn products with a variety of end-uses such as apparel, accessories, and home furnishings. Students will review the overall processes involved in manufacturing mass-produced items, develop an awareness of product construction, and become familiar with standards used in industry to determine quality.

242 Apparel Industry: Field Experience Spring-term break. 1 credit. S-U grades only. Offered alternate years. Approximate cost $300–$350; $150 deposit required before spring semester begins; remainder required by February 15. B. Ziegert. A five-day field trip to a major apparel center such as New York City. Cost includes accommodation, museum visits, and two theater tickets. Tours cover fiber, fabric, and design; inspection of manufacturers and retailers; and promotion and media establishments of the multifaceted apparel and textile industry.

245 Dress: A Reflection of American Women's Roles Spring. 3 credits. Enrollment limited to 40 students. S-U grades optional. T R 12:00–2:15; A. Racine. Historical survey of changing patterns of American women's dress from the colonial period to the present day and of cultural, economic, and political forces that affected changes and women's development. Students will investigate various topics in fashions, etiquette, and the roles of women.

264 Apparel Design II Fall. 4 credits. Each section limited to 10 students. Prerequisite: TXA 145. Recommended: two art or drawing courses. Apparel design majors should take TXA 264 and 367 in the same academic year, preferably during the sophomore year. Minimum cost of materials, $80; lab fee, $10. M W 12:20–4:25 or T R 9:05–12:05. B. Ziegert. This studio course examines two interrelated methods of apparel design. Through exercises, principles and problems of shaping, fitting, and advanced flat pattern making are studied. Assigned problems require the student to make judgments regarding the design process, the nature of materials, body structure, function, and fashion.

300 Special Studies for Undergraduates Fall or spring. Credit to be arranged. Hours to be arranged. Department faculty. Special arrangement for course work to establish equivalency for courses not transferred from a previous major or institution. Students prepare a course description of the study they want to undertake on a form available from the Student Services Office. The form, signed by both the instructor directing the study and the department chairperson, is filed at course registration or during the change-of-registration period.

331 The Textile and Apparel Industries Fall. 3 credits. Prerequisites: Economics 101 and 102 or CEH 110 and 111 and an upper-division course in either apparel or textiles, excluding field experiences. Course fee, $10. M W F 8:30–9:55; S. Hester. A critical review of the textile and apparel industries, including structure and marketing practices, and government policies that affect industry decisions and operations in such areas as economic, safety, and the environment. The role of labor unions is examined as well as the effects of international trade of textile and apparel products.

337 Formation and Structure of Textile Fabrics Spring. 3 credits. Prerequisite: TXA 135. Recommended: Education 115. Lecs, M W F 9:05, R. Schwartz. This course covers (1) how fabrics are made, (2) how the method of manufacture influences fabrics properties, and (3) how the method of manufacture limits potential applications of fabrics. The technical aspects of textile fabrics are covered in detail. Available production technologies are reviewed. Properties of woven, knitted, and unconventional fabrics, methods of constructing structural designs, and means of designing fabrics to specifications are covered.

367 Apparel Design III Spring. 3 credits. Prerequisite: TXA 264. Recommended: 3 art or drawing courses. Apparel design majors should take TXA 264 and 367 in the same academic year, preferably during the sophomore year. Minimum cost of materials, $30; lab fee, $15. T R 7:25–9:45; A. Racine. Advanced apparel students prepared to challenge and refine their design skills will be presented with a variety of complex studio problems in apparel design. The Cornell Costume Collection is used for illustration and inspiration.

406–407 402–403 Special Studies for Undergraduates Fall or spring. Credit to be arranged. S-U grades optional. Hours to be arranged. Department faculty. For advanced independent study by an individual
student or for study on an experimental basis with a group of students in a field of TXA not otherwise provided through course work in the department or elsewhere at the University. Students prepare a study for the instruction and the department chairman, and the department chairman and the student or for study on an experimental basis with a student or for study on an experimental basis with a student and the department chairman and the student. Students, in consultation with their supervisor, should register for one of the following subdivisions of independent study:

400 Directed Readings
For study that primarily involves library research and independent reading.

401 Empirical Research
For study that primarily involves data collection and analysis, or laboratory or studio projects.

402 Supervised Fieldwork
For study that involves both responsible participation in a community setting and reflection on that experience through discussion, reading, and writing. Academic credit is awarded for this integration of theory and practice.

403 Teaching Apprenticeships
Fall or spring. 2-4 credits. Prerequisites: student must have upperclass standing, have demonstrated a high level of performance in the subject to be taught and in the overall academic program, and have permission of the instructor and the department chairman. S-U grades only. Apprenticeship includes both a study of teaching methods in the field and assisting the faculty with instruction.

[431 The Textile and Apparel Industries—Field Experiences Spring-term break. 1 credit. Prerequisite: TXA 331. 2-S-U grades only. Offered alternate years. Not offered in 1987-88. Students are responsible for trip expenses, approximately $350. A one-week field experience in the textile regions of the South. Students have the opportunity to see various textile processes, including fiber production, knitting, weaving, dyeing and finishing, and designing. In addition, seminars with executives of each participating firm relate theory to current practice.]

432 Textile Testing and Evaluation Fall. 3 credits. Prerequisites: TXA 357 and statistics. Offered alternate years. Lab fee, $10. Lecs. M 2:30; lab, W 1:25–4:25. P. Schwartz. This course covers the physical and performance evaluation of textile fabrics. Lectures will cover the theory and philosophy of textile testing methods related to fabrics and will include statistical procedures for the evaluation of test data. Students will use textile testing equipment in a laboratory setting. MINTAB will be used for the analysis of test data.

433 Textile Structure and Properties Spring. 4 credits. Prerequisites: TXA 436 and Physics 101, 112, or 207. Offered alternate years. Not offered 1987-88. Lab fee, $10. Lecs. M W F 9:05; lab, W 1:25–4:25. C. C. Chu. An in-depth study of the structure of textile materials and their component parts, from polymer molecules through fibers and yarns to fabrics, and the techniques of controlling structure to achieve desirable end-use properties. Emphasis is on properties important to the consumer, including easy care, elasticity, durability, comfort, and aesthetics. Laboratory experimentation illustrates the important interrelationships among structures and properties of polymers, fibers, yarns, and fabrics.


438 Apparel Textiles Spring. 3 credits. Prerequisites: TXA 264, or permission of instructor. S-U grades only. Offered alternate years. T R 10:10–11:20. Field trips will be arranged when feasible. S. Watkins. A study of the interrelationship of human physiology, apparel design, and textiles. Consideration of communication between the consumer, government, and the apparel-textile industries. Individual or team projects. Seminars and lectures will require readings.

439 Textile Materials for Biomedical Use Spring. 2 credits. S-U grades available for non-TXA majors. Prerequisites: TXA 432 or permission of instructor. T 7:30–9:25. C. C. Chu. Focuses on chemical, physical, and biological properties of textiles and the performance of textile materials (including structures for general hospital use and internal or external use) clinical and in the laboratory. Typical materials include sutures, surgical dressings, elastic stockings, surgical apparel, and prosthetic materials. The impact of governmental regulations is also examined.

[446 Apparel Design IV: Intermediate Functional Clothing Design Spring. 3 credits. Prerequisites: TXA 264 or permission of instructor. Lab fee, $10. Lecs. T 10:10–11:40. S. Watkins. Advanced physical theory concerned with the function of clothing. Special current topics in the field will be studied. Students will be engaged in individual, semester-long research projects that result in the design and development of an apparel item. A field trip to an industry site is planned.]

461 Issues in Management and Marketing Fall. 3 credits. Prerequisites: TXA 331 or permission of instructor. Lecs. T 12:20–1:10. P. Schwartz. The course will focus on management and marketing issues of concern to the textile and apparel sector. Management topics will include labor and productivity issues, governmental interaction, adoption of technology, and the problem of foreign competition. Topics in distribution and marketing will address the importance of industry-consumer interaction, changes in the domestic and international marketplace, and the role of trade and consumer associations.

[465 Apparel Design V: Product Development and Presentation Spring. 3 credits. Prerequisites: TXA 367 or permission of instructor. Lab fee, $10. Lecs. F 12:20–1:10. B. Ziegert. Through studio problems in apparel design, students examine the influence of manufacturing technology and cost on apparel products. Lines of garments are developed to various stages from sketches to finished samples.]

500 Special Problems for Graduate Students Fall or spring. Credit to be arranged. S-U grades only. Hours to be arranged. Department chairman.

[509 Advanced Textile Structure and Properties Fall. 3 credits. Prerequisites: TXA 331 or permission of instructor. Offered alternate years. Not offered 1987-88. M W F 10:10. C. C. Chu. The theory and physicochemical properties of natural and synthetic fibers, elastomeric materials, high-performance polymers, and inorganic materials used as textile fibers, and the relationship between their chemistry and functional properties as textile materials. Other topics include polymerization processes, textile-finishing processes, dyes and dyes and dyeing, and degradation of textile materials under environmental conditions.

537 Graduate Seminar in Textiles and Apparel Fall and spring. 1 credit each term. S-U grades only. Required every semester of all graduate students in textiles. Open to advanced undergraduates who have permission of instructor. T 12:20–1:10. P Schwartz, fall; A. Lemley, spring. A study of the pioneering research in the mechanics of textile structures: creep phenomena and the dynamic properties of fibers and yarns; idealized yarn and fabric models and their relationship to research data: special topics in the deformation of yarns and fabrics in tension, shear, and compression stress; fabric bending and buckling; and the mechanical behavior of nonwoven materials.

[899 Master's Thesis and Research Fall or spring. Credits to be arranged. Prerequisites: permission of the chairperson of the graduate committee and the instructor. S-U grades only. Hours to be arranged. Field graduate faculty.]
Faculty Roster

Allen, Josephine A., Ph. D., U. of Michigan. Assoc. Prof., Human Service Studies
Anderson, Carol L., Ph.D., Iowa State U. Assoc. Prof., Human Development and Family Studies
Babcock, Robert J., Ed. D., Cornell U. Assoc. Prof., Human Service Studies
Bar, Donald J., Ph.D., Iridiana U. Assoc. Prof., Human Service Studies
Battistella, Roger M., Ph.D., U. of Michigan. Prof., Human Service Studies
Bayer, Helen T., Ph.D., Cornell U. Assoc. Prof., Design and Environmental Analysis
Bianchi, Peter S., Ph.D., Brown U. Assoc. Prof., Consumer Economics and Housing
Ceci, Stephen J., Ph.D., U. of Exeter (England). Assoc. chairperson of the graduate committee and the
Credit to be arranged. Prerequisite: permission of the
Bushnell, Allen R., M.FA., Cranbrook Acad, of Art. Assoc. Prof., Design and Environmental Analysis
Brumberg, Joan J., Ph.D., U. of Virginia. Asst. Prof., Human Development and Family Studies
Bronfenbrenner, Urie, Ph.D., U. of Michigan. Prof., Human Development and Family Studies
Babcock, Robert J., Ph.D., U. of Michigan. Assoc. Prof., Design and Environmental Analysis
Boegly, Carolyn O., M.S., U. of Wisconsin. Assoc. Prof., Cooperative Extension
Boyd, D. Michael, B.A., U. of North Iowa. Assoc. Prof., Design and Environmental Analysis
Broadwell, George J., Ph.D., Cornell U. Assoc. Prof., Cooperative Extension
Braithwaite, Urie, Ph.D., U. of Michigan. Jacob Gould Schurman Professor, Human Development and Family Studies
Brumberg, Joan J., Ph.D., U. of Virginia. Asst. Prof., Human Development and Family Studies
Bryant, W. Keith, Ph.D., Michigan State U. Prof., Human Development and Family Studies
Buchanan, Robert J., Ph.D., U. of Virginia. Asst. Prof., Human Service Studies
Buchan, Robert J., Ph.D., U. of Virginia. Asst. Prof., Human Service Studies
Chi, Chi-Hsin Chang, Ph.D., Cornell U. Assoc. Prof., Textiles and Apparel
Cochran, Moncrieff, Ph.D., U. of Michigan. Assoc. Prof., Human Development and Family Studies
Conroy, John C., Ph.D., U. of California at Los Angeles. Prof., Human Development and Family Studies
Correll, Steven W., Ph.D., Pennsylvania State U. Asst. Prof., Human Development and Family Studies
Danko, Sheila M., I.D., Rhode Island School of Design. Asst. Prof., Design and Environmental Analysis
Davey, Alice J., Ph.D., Michigan State U. Prof., Consumer Economics and Housing
Doris, John L., Ph.D., Yale, U. Prof., Human Development and Family Studies
Dewey, Robert E., Ph.D., Tufts U. Asst. Prof., Human Development and Family Studies
Field, Harold, Ph.D., U. of Michigan. Prof., Emeritus, Human Development and Family Studies
Ford, John L., Ph.D., U. of Michigan. Assoc. Prof., Human Service Studies
Gane, Clark E., M.F.A., U. of Kansas. Assoc. Prof., Design and Environmental Analysis
Gerber, Jennifer L., Ph.D., U. of Wisconsin. Assoc. Prof., Consumer Economics and Housing
Greene, Jennifer C., Ph.D., Stanford U. Asst. Prof., Human Service Studies
Hahn, Alan J., Ph.D., Indiana U. Assoc. Prof., Human Service Studies
Harding, John S., Ph.D., Harvard U. Prof., Human Development and Family Studies
Heck, Ramona K. Z., Ph.D., Purdue U. Assoc. Prof., Consumer Economics and Housing
Hedge, Alan, Ph.D., U. of Sheffield (England). Assoc. Prof., Design and Environmental Analysis
Hester, Susan G., Ph.D., Virginia Polytechnic Institute and State U. Asst. Prof., Textiles and Apparel
Hogarth, Jeanne M., Ph.D., Ohio State U. Asst. Prof., Consumer Economics and Housing
Kramer, Carol S., Ph.D., Michigan State U. Asst. Prof., Consumer Economics and Housing
Lee, Lee C., Ph.D., Ohio State U. Assoc. Prof., Human Development and Family Studies
Lemley, Ann T., Ph.D., Cornell U. Assoc. Prof., Textiles and Apparel
Lust, Barbara C., Ph.D., City U. of New York. Assoc. Prof., Human Development and Family Studies
McClimont, Charles C., Ph.D., SUNY at Buffalo. Assoc. Prof., Human Service Studies
McKee, Wayne, E., Ph.D., U. of Michigan. Assoc. Prof., Consumer Economics and Housing
Mirot, Marion E., Ph.D., Cornell U. Prof., Human Service Studies
Moore, Phyllis, Ph.D., U. of Minnesota. Assoc. Prof., Human Development and Family Studies
Mueller, B. Jeanne, Ph.D., U. of Wisconsin. Prof., Human Service Studies
Nattrass, Anil, Ph.D., U. of North Carolina. Asst. Prof., Textiles and Apparel
Noble, Lucinda A., Ph.D., U. of North Carolina. Prof., Human Service Studies
Obendorf, Sharon K., Ph.D., Cornell U. Prof., Textiles and Apparel
Ostrander, Edward R., Ph.D., U. of Illinois. Assoc. Prof., Design and Environmental Analysis
O'Shaughnessy, Patricia B., Ph.D., Syracuse U. Assoc. Prof., Consumer Economics and Housing
Potts, Marion H., Ph.D., Penn State U. Prof., Human Development and Family Studies
Purchase, Mary E., Ph.D., Iowa State U. Prof., Textiles and Apparel
Reschovsky, James D., Ph.D., U. of Michigan. Asst. Prof., Consumer Economics and Housing
Riccioni, Henry N., Ph.D., Fordham U. Prof., Human Development and Family Studies
Robinson, Jean R., Ph.D., Radcliffe C. Prof., Consumer Economics and Housing
Saltford, Nancy C., Ph.D., Purdue U. Prof., Textiles and Apparel
Savin-Williams, Richard C., Ph.D., U. of Chicago. Assoc. Prof., Human Development and Family Studies
Schoggen, Phil, Ph.D., U. of Kansas. Prof., Human Development and Family Studies
Schwarz, Peter D., North Carolina State U. Asst. Prof., Textiles and Apparel
Shapiro, Constance H., Ph.D., Cornell U. Assoc. Prof., Human Service Studies
Simms, William R., Ph.D., Massachusetts Inst. of Technology. Prof., Design and Environmental Analysis
Streight, Lloyd C., Ph.D., U. of California at Berkeley. Assoc. Prof., Human Service Studies
Suci, George J., Ph.D., U. of Illinois. Prof., Human Development and Family Studies
Thornton, Michael C., Ph.D., U. of Michigan. Asst. Prof., Human Development and Family Studies
Trock, William M., Ph.D., Northwestern, U. Assoc. Prof., Human Service Studies
Utterhöfen-Lovellace, Virginia, M.D., Columbia U. Assoc. Prof., Human Service Studies
Walker, Elaine F., Ph.D., U. of Missouri. Assoc. Prof., Human Development and Family Studies
Watkins, Susan M., M.S., Pennsylvania State U. Prof., Textiles and Apparel
White, M. Vivian, Ph.D., U. of Leeds (England) Prof., Textiles and Apparel
White-Means, Shelley I., Ph.D., Northwestern U. Asst. Prof., Consumer Economics and Housing

338 Human Ecology

Verka, Betty L., Ph.D., Syracuse U. Assoc. Prof., Human Service Studies
Ziegler, Berute E. I., B.A., U. of Toronto (Canada). Asst. Prof., Textiles and Apparel
Ziegler, Jerome M., M.A., U. of Chicago. Prof., Human Service Studies
Zorn, Peter M., Ph.D., U. of California at Davis. Asst. Prof., Consumer Economics and Housing
New York State School of Industrial and Labor Relations

Administration

Robert E. Doherty, dean
Lois S. Gray, associate dean, extension and public affairs
David B. Lipsky, associate dean for resident instruction
Jonathan Lev, assistant dean, school relations
James E. McPherson, assistant dean, Office of Student Services
Shirley Harper, librarian
Ronald G. Ehrenberg, director, research
Frances Benson, director, publications
Michael Abarbanell, director of budget
Lawrence K. Williams, graduate faculty representative
Donald E. Cullen, editor, Industrial and Labor Relations Review

Department of Instruction

Courses in the school are organized into six departments:

- **Collective Bargaining, Labor Law, and Labor History** studies the history of the labor movement and collective bargaining in the United States, as well as the role of government in labor relations.
- **Economic and Social Statistics** includes the principles of statistical reasoning, statistical methods, and the application of statistical tools of analysis.
- **International and Comparative Labor Relations** is concerned with industrial and labor relations developments in other countries, both industrialized and less developed.
- **Labor Economics** deals with analysis of the labor force, labor markets, wages and related terms of employment, income distribution, unemployment, health and safety in industry, and retirement.
- **Organizational Behavior** investigates human behavior in organizations through psychology and sociology. Courses treat individual human behavior, organizations in society, and industrial society.
- **Personnel and Human Resource Studies** examines the efforts of work organizations to recruit, train, compensate, and manage their members, as well as public policy and programs concerning employability, employment, and income of workers.

A full list of required and elective courses is available from the Office of Student Services, 101 Ives Hall.

Resident Instruction

This division conducts the on-campus programs leading to the degrees of Bachelor of Science, Master of Industrial and Labor Relations, Master of Science, and Doctor of Philosophy from Cornell.

Office of Student Services

Staff members from the Office of Student Services, 101 Ives Hall, work closely with faculty and faculty committees to administer degree programs for the school and many of the school's support services. The office's responsibilities include the admitting and orienting of new students, maintaining student personal and academic records, and counseling students on personal and academic problems. The office also works closely with seniors who are planning graduate study.

Counseling and Advising

New students will be provided advising on orientation, academic procedures, and course registration by counselors in the Office of Student Services.

Each of the school's academic departments names faculty members to serve as advisers for students who wish to consult with them regarding course selection, career possibilities in the field, postgraduate programs, or similar matters. Questions or issues related to graduation requirements, course registration, and related academic procedures should be raised with counselors in the Office of Student Services.

Minority Students

Cornell University administers a variety of special opportunity programs designed to provide financial assistance and other forms of assistance to (1) minority students and (2) low-income students meeting program guidelines. The purpose of these programs is to open access to a Cornell education for capable students who otherwise might not secure the admissions consideration, financial assistance, or supportive services necessary for their success at the university. The associate director for minority education in the Office of Student Services provides academic and personal counseling to all ILR minority students. ILR offers a variety of support services to enhance academic achievement. For details, prospective students should contact ILR Admissions.

Study Options

Several study options are open to ILR undergraduates, making it possible to tailor a program to fit special circumstances.

One such option is the five-year ILR master's degree. With early planning, some students may earn the M.S. degree in the fifth year. Using another option, some ILR students arrange for dual registration in the Johnson Graduate School of Management, earning their bachelor's degree in ILR and a master's degree in the Johnson Graduate School of Management after five years of study.

Some students elect to spend a semester in New York City, Albany, or Washington, D.C., with a chance to observe actual labor problem solving as interns in congressional offices, labor organizations, personnel offices, and state and federal agencies. For more information, see "Special Academic Programs," below.

Study abroad options are also available at a number of foreign universities. Qualified students may spend a semester or a full year studying abroad.

A number of ILR courses deal directly with today's problems and involve fieldwork in the Ithaca area and elsewhere in New York State. The ILR program allows juniors and seniors who want to conduct their own research to receive course credit for individually directed studies if the program is supervised by a faculty member.

Study in Absentia

Registration in absentia enables a student to seek admission in another American institution for a semester or a year and transfer credit toward completion of the Cornell degree. This study option requires the development of a plan of study; a statement of appropriate reasons for study away from the university (e.g., availability of courses not offered at Cornell), good academic standing, approval of the plan by the director of student services, and payment of a special in absentia registration fee. Course work taken in absentia is usually not evaluated for transfer credit until the work has been completed and the student has returned to the school. Students then submit a course syllabus and other evidence of content to the chairman of the department that might have offered the respective course, or to a counselor in the Office of Student Services if the course is more appropriate as a general elective.

Leave of Absence or Withdrawal

If a student desires to withdraw or take a leave of absence from the university, an interview should be scheduled with a counselor in the Office of Student Services. Counselors will assist students in petitioning for approval of a leave of absence and in contacting the appropriate offices or departments of the university.

Requirements for Graduation

To earn the Cornell Bachelor of Science degree in industrial and labor relations, the student needs to successfully complete 120 credits. Normally, this requires eight terms, although some students finish their studies in a shorter time.
Required Courses

(55 credits)
The curriculum prescribes the courses and subjects listed in the table below, to be taken in the terms indicated during the freshman, sophomore, and junior years. In the senior year, all courses will be electives.

<table>
<thead>
<tr>
<th>Course or Subject</th>
<th>Credits</th>
<th>Term</th>
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<tbody>
<tr>
<td>Freshman Year</td>
<td></td>
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<tr>
<td>Freshman Seminars*</td>
<td>6</td>
<td>Fall and spring</td>
</tr>
<tr>
<td>Econ 101–102, Micro-, Macroeconomics*</td>
<td>6</td>
<td>Fall and spring</td>
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<tr>
<td>Psych 101, Introduction to Psychology*</td>
<td>3</td>
<td>Fall</td>
</tr>
<tr>
<td>I&amp;LR 100, History of Industrial Relations in the United States</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>I&amp;LR 120, Micro Organizational Behavior and Analysis</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>I&amp;LR 210, Statistics I</td>
<td>4</td>
<td>Spring</td>
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<tr>
<td>Any two of the following:</td>
<td>6</td>
<td>Spring</td>
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<tr>
<td>Sophomore Year</td>
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<tr>
<td>I&amp;LR 201, Labor Relations Law and Legislation</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>I&amp;LR 240, Economics of Wages and Employment</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>I&amp;LR 211 Statistics II</td>
<td>3</td>
<td>Fall</td>
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<tr>
<td>I&amp;LR 260, Personnel Management</td>
<td>3</td>
<td>Fall or spring</td>
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<tr>
<td>I&amp;LR 200, Collective Bargaining</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Ag Econ 221, Accounting</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>I&amp;LR 101 or I&amp;LR 140 or I&amp;LR 121</td>
<td>3</td>
<td>Spring</td>
</tr>
<tr>
<td>Junior Year</td>
<td></td>
<td></td>
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<tr>
<td>I&amp;LR 340, Economic Security</td>
<td>3</td>
<td>Fall or spring</td>
</tr>
</tbody>
</table>

*College of Arts and Sciences

Elective Courses

(65 credits)
From the courses offered by the school, students must select a minimum of 27 credits of I&LR elective courses. No more than 9 of these credits may be satisfied by I&LR 499, Directed Studies, or I&LR 497–498, Internships, or I&LR 495, Honors Program.

Undergraduates are required to select one course in the humanities and one intensive writing course (each for a minimum of three credits) from a list of designated courses to be completed during the sophomore, junior, or senior years.

The remaining 33 credits may be selected from the courses of any other college at Cornell, but a student who takes more than 33 credits in the endowed colleges (the College of Architecture, Art, and Planning; the College of Arts and Sciences; the Johnson Graduate School of Management; the College of Engineering; and the School of Hotel Administration) will be billed for the additional tuition at the current cost per credit.

The number of credits that may be taken in the endowed colleges at no additional cost to the student may be changed at any time by official action of the school.

Scheduling and Attendance

Schedule Changes
Occasionally it may be necessary for a student to request changes in his or her course schedule either before a term begins or during the semester. Such requests must be directed to the Office of Student Services in order to avoid possible loss of academic credit.

Class Attendance
It is each student’s responsibility to attend all scheduled classes unless approved excuses have been given by the faculty. In some courses an instructor may permit a maximum number of class absences without a grade penalty or dismissal from the course. An explanation for absence from class may occasionally be secured from the Office of Student Services in advance of the expected absence. An approved absence may be warranted by:

1. participation in University activities such as athletic events, dramatic productions, or debates;
2. medical problems supported by a record of clinic or infirmary treatment;
3. serious illness or death in the immediate family; or
4. other circumstances beyond the student's control.

A request for explanation of an absence should, when possible, be made to the Office of Student Services before the date of expected absence. A reported and explained absence does not relieve a student from fulfilling academic requirements during the period of absence. The course instructor has the authority to determine what work must be completed. The office can only confirm the explanation for absence. Students should inform the Office of Student Services of any problems they have meeting course requirements.

Academic Standing and Grades

Academic Integrity
In 1977 the faculty of the School of Industrial and Labor Relations approved a revised code of academic integrity. This code, while based on the Cornell University code, varies somewhat.

Absolute integrity is expected of all Cornell students in all academic undertakings. They must in no way misrepresent their work, fraudulently or unfairly advance their academic status, or be a party to another student's failure to maintain academic integrity. The code specifically prohibits:

1. knowingly representing the work of others as one's own;
2. using or obtaining unauthorized assistance in any academic work;
3. fabricating data in laboratory or field work.

Full details on the applications of those prohibitions to course work, term papers, examinations, and other situations are listed in the code. Copies are available from the Office of Student Services, 101 Ives Hall.

Dean's List
A Dean’s List is compiled for each of the four undergraduate classes each term on the seventh day following receipt of final grades from the registrar. Eligibility for the Dean’s List is determined by applying all of the following criteria:

1. achievement of a term average for freshmen of 3.3 or better; for sophomores of 3.4 or better; and for juniors and seniors of 3.6 or better;
2. a minimum course load for the term of 12 letter-graded credits;
3. completion of all courses registered for at the beginning of the term;
4. satisfaction of all good-standing requirements.

Academic Standing
Good standing requires that all of the following criteria be met at the end of each term:

1. an average of C– (1.7) for the semester's work, including a minimum of 8 completed and graded credits;
2. no failing grades in any course, including physical education;
3. a cumulative average of C– (1.7) for all completed terms.

If at the end of any term a student fails to maintain good standing or if overall academic performance is so marginal as to endanger the possibility of meeting school and university degree requirements, his or her record is reviewed by the Committee on Academic Standards and Scholarships. The committee may issue a written warning to the student at that time.

Involuntary Separation from the School for Academic Reasons
A student may be denied permission to reregister at the end of any term when he or she has failed:

1. to establish good standing after a semester on warning;
2. to maintain an average of 1.7 in any term after a previous record of warning;
3. to achieve good standing after being on warning any two previous semesters;
4. two or more courses in one term or has a term average of 1.0 or below.

The Academic Standards and Scholarship Committee may decide to permit a student to remain on warning more than one semester if there has been significant improvement even though the cumulative average is still below 1.7.

S-U Grading Policy
An undergraduate may register to receive a final grade of S (Satisfactory) or U (Unsatisfactory) in courses that offer this option—either in the school or in other divisions of the University—subject to the following conditions:

1. the S-U option may be used in I&LR and in out-of-college course electives only; not in directed studies;
2. students are limited to registering in two S-U courses a term;
3. S-U registration is limited to 4 credits for each course;
4. students registering for S-U grades must be in good standing;
5. students must fulfill the graduation requirement of 105 letter-graded credits.

ILR faculty members assign a grade of U for any grade below C– and a grade of S for any grade of C– or better. A grade of U is considered equal to an F in determining a student’s academic standing, although it is not included in the cumulative average.

No change of grading (from letter to S-U or from S-U to letter) may be made after the first three weeks of class.

Incomplete Grades
An incomplete (INC) is a grade assigned when the course has not been completed for reasons that are acceptable to the instructor. It is understood that the work may be completed later and credit given.

Instructors may grant a grade of incomplete for a limited number of clearly valid reasons, but only to students with substantial equity in a course. A term and definite agreement on the conditions under which it may be made up must be made with the instructor. The school’s policy allows a maximum of two terms of residence for completion of a grade of incomplete. If it is not made up within this time automatically becomes an F grade.
Special Academic Programs
In order to meet the special academic objectives of some students, the school's faculty has established several special academic programs. For additional information, students should contact a counselor in the Office of Student Services. Counselors will explore the program with students to help them decide if it suits their interests.

Dual Registration in the Johnson Graduate School of Management
Dual informal registration in the Johnson Graduate School of Management leads to a Bachelor of Science degree in industrial and labor relations and a master's degree in management after five years of study and is open to students who meet the requirements of the Johnson Graduate School of Management. Early planning by each student, preferably in the sophomore year, is desirable to ensure that the expectations of the Johnson Graduate School of Management and I&LR curriculum requirements are fulfilled. Students interested in the very limited and selective program of the Johnson Graduate School of Management should contact the Admissions Office, 319 Malott Hall, and a counselor at the Office of Student Services.

Five-Year Master of Science Degree Program
With early planning it is possible to earn the M.S. degree in a fifth year of study. This program is designed specifically for those who wish concentrated study in an area of specialization in the school for a Master of Science degree. Students considering this program should consult a counselor in the Office of Student Services after their freshman year.

Internships
The Credit Internship Program has provided students with a vivid understanding of problems in labor and industrial relations through observation and participation in "real-life" labor problem solving. A number of selected students spend a term of the junior year in Albany, New York City, or Washington, D.C., in close contact with practitioners. Their activities include independent research under direction of I&LR faculty members and seminars drawing on fieldwork experience with employers, labor organizations, and government agencies. More information about this program is available from the Office of Student Services.

Honors Program
Undergraduates who are ranked in the top 20 percent of their class at the end of the junior year may propose a two-semester research project, an honors thesis, for review by the Committee on Academic Standards and Scholarships. When approved, the candidate for graduation with honors works for two semesters (for 3 credits in each term) to research, write, and then defend the thesis.

Study Abroad
Cornell students with strong academic records and the necessary preparation in required and elective courses are encouraged to consider study abroad. The university currently has agreements with universities in Germany, Israel, England, and the Scandinavian countries that permit undergraduates to register for courses while maintaining Cornell registration and financial aid for a semester or a year. Information about those opportunities may be requested from Cornell Abroad, in the Center for International Studies, 130 Uris Hall.

Some study abroad programs require the development of language proficiency and preparation in appropriate courses at Cornell. Students should consult the Office of Student Services and Cornell Abroad in the freshman and sophomore years to be sure that they comply with the academic and procedural requirements for study abroad.

Collective Bargaining, Labor Law, and Labor History


100 History of Industrial Relations in the United States
Fall or spring. 3 credits.
C. Daniel, I. DeVault, G. Korman, N. Salvatore. This review of American labor history emphasizes the twentieth century. The course concentrates on American workers, their labor movements, and the forces that have shaped industrial relations in the United States. Readings are selected from scholarly accounts and original sources.

101 Special Studies in the History of Industrial Relations in the United States
Fall or spring. 3 credits.
C. Daniel, I. DeVault, G. Korman, N. Salvatore. Several historians offer undergraduate courses: Labor between the Wars, Labor and the Left, Immigrant Workers, Workers and Wars of the Twentieth Century, Women and Work, and about other periods and themes of American labor history.

200 Collective Bargaining
Fall or spring. 3 credits.
J. Burton, D. Cullen, H. Katz;, D. Lipsky, P. Ross, Ron Seебer. A comprehensive study of collective bargaining; the negotiation and scope of contracts; the day-to-day administration of contracts; the major substantive issues in bargaining, including their implication for public policy, and the problem of dealing with industrial conflict.

201 Labor Relations Law and Legislation
Fall, spring, or summer. 3 credits.
T. Crivens, M. Gold, J. Gross, R. Lieberwitz. A survey of the law governing labor relations. The legal framework in which the collective bargaining relationship is established and bargaining takes place is analyzed. Protection and enforcement of collective agreements are considered, as are problems of protecting individual employee rights in the collective labor relations context. Also serves as an introduction to the legal system and method and to legal and constitutional problems of governmental regulation of industrial and labor relations.

301 Labor Union Administration
Fall. 3 credits. Prerequisites: I&LR 100 and 201.G. Brooks, R. Seeебer. Study and analysis of the structure and operations of American unions, including the complicated internal life of the organizations: the varied environments in which unions develop and grow or decline; the relationship of national unions, local unions, and members in the many different aspects of internal union government; the ways in which unions are set up to handle organizing, collective bargaining, contract administration, and political activity; and the widespread movement toward merger and consolidation of unions that began in the sixties and continues today. All of these will involve a study of union constitutions and other primary documents and secondary readings. Attention will be given to relevant legislation, current problems of unions, and the eternal problems of attaining union democracy.

303 Research Seminar in the Social History of American Workers
Fall or spring. 4 credits. Limited to upperclass students who have demonstrated their ability to undertake independent work and who have received permission of the instructor. G. Korman. An examination of a different subject each year.

304 Seminar in the History, Administration, and Theories of Industrial Relations in the United States
Fall or spring. 4 credits. Prerequisite: permission of instructor. C. Daniel, I. DeVault, G. Korman, N. Salvatore. Designed to explore the social, economic, and political background of industrial relations in the history of the United States. Examines a different subject each year.

305 Labor in Industrializing America: 1865–1920
Fall. 3 credits. Prerequisite: I&LR 100 and 101. N. Salvatore. Examines the experience of working people in the years between the Civil War and World War I. It will explore both the workers themselves—their organization, diverse cultures, ethnic and racial traditions, and political activities—and the dramatic changes in industry that reshaped American life during this period.

381 Jewish Workers in Europe and America, 1835–1948
Fall or spring. 4 credits. Open to sophomores, juniors, and seniors. G. Korman. This course in comparative history examines the unique experiences of the Yiddish-speaking immigrant workers and their families. A special subject of interest is the extraordinary history of the Jewish working classes between 1924 and 1948.

382 American Business and Workers of the World Since 1840
Fall or spring. 4 credits. G. Korman. This social history of economic affairs and institutions examines the subjects of work and labor from the perspective of American business. In particular, the course focuses upon corporate capitalists in their capacities as profit seekers, employers of segmented workers, managers of production and distribution, and citizens of the republic.

400 Union Organizing
Spring, weeks 1–7. 2 credits. 2 meetings each week. D. Cullen, R. Donovan. This course explores various aspects of unions' attempts to organize workers: why some workers join unions and others do not, the techniques used by both unions and employers during organizing campaigns, and the present law of organizing and proposed amendments to that law. Includes an examination.

403 The Law of Workers' Compensation
Spring, weeks 7–14. 2 credits. J. Burton. A survey of legal aspects of workers' compensation, the program that provides cash benefits, medical care, and rehabilitation services to workers disabled by work-related injuries and diseases.

404 Contract Administration
Fall, weeks 1–7. 2 credits. Prerequisites: undergraduates, I&LR 200 and 201; graduate students, I&LR 500 and 501. G. Korman. This course bridges the gap between I&LR 200 (500), Collective Bargaining, and I&LR 602, Arbitration. It focuses on various aspects of dispute settlement process prior to final resolution. The intent of the course is to expand the knowledge of students rather than to develop personal skills. It includes such topics as (1) the historical development of contractual grievance process, (2) the merits of various alternative processes that have been adopted by unions and management in the United States, (3) the impact of external law on the behavior of the parties in the adjustment process, (4) a comparison of the U.S. system with systems in other industrialized economies, (5) current issues and
problems in the systems, (6) nonunion grievance processes, and (7) ongoing experimental alternatives to the standard systems.

406 History of the Black Worker in the United States Fall. 3 credits. Prerequisite: I&LR 100. J. Gross.

Intended to introduce the student to the history of the black worker in the United States through a review and analysis of both black labor history and through source documents from the National Archives. Discussions will center around the black worker in agriculture, industry, and government; black worker migrations; black workers and organized labor; and black workers, discrimination, and the law.

407 Contemporary Trade Union Movement Fall. 3 credits. Prerequisite: I&LR 100 or 502, upperclass standing.

N. Salvatore.

An examination of contemporary trade union issues in the context of labor's history since World War II. Among the issues to be discussed are centralization of union power, union democracy, political action, and strategies of collective bargaining. A series of speakers from the union movement will address the class. Midterm, final, and term paper are required.

484 Employment Discrimination and the Law Fall. 4 credits. Prerequisite: I&LR 201 or 501 or equivalent.

T. Crivens, M. Gold.

An examination of legal problems involving employment discrimination based on race, color, religion, sex, national origin, or age. The impact of developing principles of law on preemployment inquiries and testing, seniority and promotions, and other personnel policies, practices, and procedures are discussed. The remainder of the course is affirmative action under Executive Order 11246, as amended. Special attention is given to the role of state law in resolving employment discrimination claims and the procedural framework for raising and adjudicating such claims before administrative agencies and the courts.

485 THE Law of Occupational Safety and Health Spring, weekends 4-7 credits. Prerequisite: I&LR 201 or 501 or permission of instructor. J. Burton.

Primary concern is legal developments concerning the Occupational Safety and Health Act of 1970. Limited attention is given to related issues such as arbitration of safety and health issues.

495 Honors Program Fall and spring (yearlong course). 3 credits each term. Admission to the ILR senior honors program may be obtained under the following circumstances: (a) students must be in the upper 20 percent of their class at the end of their junior year; (b) an honors project, entailing research leading to completion of a thesis, must be proposed to an ILR faculty member who agrees to act as thesis supervisor; and (c) the project, endorsed by the proposed faculty sponsor, is submitted to the Committee on Academic Standards and Scholarships.

Accepted students embark on a two-semester sequence. The first semester consists of determining the issues to be researched and a committee consisting of the thesis supervisor, a second faculty member designated by the appropriate department chairperson, and a representative from the Academic Standards Committee.

497-498 Internship Fall or spring. 497, 3 credits; 498, 6 credits.

Staff.

All requests for permission to register for an internship must be approved by the faculty member who will supervise the project and the chairman of the faculty member's academic department before submission for approval by the Committee on Academic Standards and Scholarship. Upon approval of the internship, the Office of Student Services will register each student for 497, for 3 credits graded A + to F; for individual research, and for 498, for 6 credits graded S-U, for completion of a professionally appropriate learning experience, which is graded by the faculty sponsor.

499 Directed Studies Fall or spring. 3 credits.

For students who wish to undertake independent research under the direction of a member of the faculty, in a special area of labor relations not covered by regular course offerings. Registration is normally limited to seniors who have demonstrated ability to undertake independent work. Eligible students should consult a counselor in the Office of Student Services at the time of course registration to arrange for formal submission of their projects for approval by the Academic Standards Committee.

500 Collective Bargaining Fall or spring. 3 credits.

T. Crivens, M. Gold, J. Gross, R. Lieberwitz.

A survey and analysis of the labor relations law that examines the extent to which the labor laws protect and regulate concerted action by employees in the labor market. The legal framework within which the collective bargaining takes place is considered and analyzed. Problems of the administration and enforcement of the collective agreement are considered, as are problems of protecting the individual member-employee rights with the union.

501 Labor Relations Law and Legislation Fall, spring, or summer. 3 credits.

T. Crivens, M. Gold, J. Gross, R. Lieberwitz.

An advanced seminar in labor arbitration emphasizing the practical aspects of current labor arbitration techniques and problems. Subjects considered range from laboratory exercises in the presentation of an arbitration case, the preparation of prehearing and posthearing briefs, and the writing of an arbitration opinion and award to the investigation and evaluation of the experience of labor arbitrators, with selected case problems arising in state and federal employment and public education as well as in the private sector.

601 The Bargaining Process: Theory and Practice Fall. 3 credits. Prerequisite: I&LR 200 or 500. D. Lipsky.

Focus is on theories of the bargaining process, including economic, behavioral, game-theoretic, political, and social-psychological approaches to the bargaining problem. Will consider union wage policy, particularly the formation of union goals in bargaining. Union and management preparation for negotiations, bargaining strategies and tactics, and bargaining power are some of the facets of the bargaining process that will be discussed. Attempts at empirical verification of various bargaining theories will also be considered. Theoretical and analytical principles will be developed in assigned readings and class discussions. The application and practical relevance of these principles will be explored through mock negotiations and other exercises.

602 Arbitration Fall or spring. 4 credits. Limited to 21 students. Prerequisites: undergraduates, I&LR 200; graduate students, I&LR 500; permission of instructor. J. Gross.

A study of the place and function of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of an arbitration hearing, and the preparation of an arbitration opinion.

603 Governmental Adjustment of Labor Disputes Fall or spring. 3 or 4 credits. Prerequisites: undergraduates, I&LR 200; graduate students, I&LR 500.

D. Cullen.

An examination of the various governmental techniques for dealing with labor disputes in both the private and public sectors, including mediation, fact-finding arbitrations (both voluntary and compulsory), the use of injunctions, and seizure. The course also examines the application of these techniques under the Railway Labor Act, Taft-Hartley Act, and various state acts.

604 Readings in the Literature of American Radicalism and Dissent Fall or spring. 3 credits. Limited to seniors and graduate students.

N. Salvatore.

Each term, concentration is on a different historical aspect of American radicalism and dissent.

605 Readings in the History of Industrial Relations in the United States Fall. 3 credits. Limited to seniors and graduate students.

C. Daniel, G. Korman, N. Salvatore.

A seminar covering, intensively original printed sources and scholarly accounts for different periods in American history.

606 Theories of Industrial Relations Systems Fall or spring. 3 credits. Limited to seniors and graduate students. Prerequisites: seniors, I&LR 100 and 101; graduate students, I&LR 502.

C. Daniel, H. Katz, G. Korman.

An advanced seminar in the leading theories concerning the origins, forms, organization, administration, aims, functions, and methods of industrial relations systems. Among the theories studied are those formulated by Karl Marx, Mikhail Bakunin, Georges Sorel, Vladimir Lenin, Lujo Breton, Beatrice and Sidney Webb, Herbert Croly, Antonio Gramsci, Selig Perlman, Frank Tannenbaum, the Guild Socialists, Karl Polanyi, Clark Kerr, Frederick Harbison, John Dunlop, and Charles A. Myers.

607 Arbitration and Public Policy Spring. 3 credits. Limited to 10 ILR students and 10 law students. Prerequisite: I&LR 201 and permission of instructor. J. Gross.

Labor arbitration in the public and private sectors. Students will write research memoranda, briefs, and arbitral opinions on various substantive and procedural topics. Forty to fifty pages of written work will be expected. There will also be opportunity to participate in simulated arbitration proceedings.

608 Special Topics in Collective Bargaining, Labor Law, and Legislation Fall or spring. 3 credits. Prerequisites: undergraduates, I&LR 201; graduate students, I&LR 502.

Staff.

The areas of study are determined each semester by the instructor offering the seminar.
609 Law of Workers' Compensation  Fall 3 or 4 credits. Prerequisite: ILR 201 or 501 or permission of instructor. J. Burton
A survey of legal aspects of workers' compensation, the program that provides cash benefits, medical care, and rehabilitation services to workers disabled by work-related injuries and diseases. Includes a brief introduction to the disability benefits provided by the Social Security program and to negligence suits by injured workers.

551 Industrial Relations in Transition  Spring 3 credits. Limited to seniors and graduate students. H. Katz
Consideres whether new developments such as concession bargaining, worker participation programs, and the like, have led to a fundamental transformation in industrial relations practice. Will review recent research and new theories arguing that such a transformation is occurring, including the work of Piore and Sabel, Bleustein and Harrison, and Kochan, McKersie, and Katz. Will also review the counterarguments and evidence put forth by those who believe no such transformation is under way. Course material will focus on industrial relations practice in the private sector in the United States, although some attention will be paid to developments in Western Europe, the United Kingdom, and Japan.

655 Employment Law  Spring 3 credits. Prerequisite: undergraduates, ILR 201; graduate students, ILR 501.
M. Gold, C. Gramm, or J. Burton
This course will examine a number of major federal and state laws designed to protect workers in their employment relationships. The historical and theoretical rationales, the major statutory, judicial, and administrative developments, and evidence of the effectiveness of each law will be examined. Where pertinent, consideration will also be given to current controversies surrounding the laws. The material covered will be drawn from the Fair Labor Standards Act, unemployment insurance, workers' compensation, the Occupational Safety and Health Act, the Employee Retirement Income Security Act, the Civil Rights Act, and state workers' right-to-know, plant closings, and protection of workers' privacy.

680 Problems in Union Democracy  Fall or spring 3 credits.
M. Gold, P. Ross
Unions are considered as an example of private government, and union democracy is examined by standards and customary practices in both public and private governments. Included are such elements as elections; self-government by majority; rights of minorities; the judicial process, including impartial review; local-national relationships; constituency and representation; the legislative process; and executive power and functions. The regulation of private government by the state will be considered.

681 Labor Relations Law  Spring 3 credits. Prerequisite: ILR 201 or 501 or equivalent.
M. Gold, R. Lieberwitz
An advanced course in labor law, concentrating on problems of administering the National Labor Relations Act; the Landrum-Griffin Act; Title VII of the Civil Rights Act of 1964, as amended; the Fair Labor Standards Act, as amended; the Equal Pay Act; the Age Discrimination in Employment Act; the Occupational Safety and Health Act; and state workers' compensation and unemployment insurance systems.

682 Seminar in Labor Relations Law and Legislation  Fall or spring 3 credits. Limited enrollment. Prerequisite: permission of instructor. R. Lieberwitz
Legal problems in public employment and other areas of labor relations affecting the public sector.

683 Research Seminar in the History of Industrial Relations  Fall or spring 3 credits. Prerequisites: undergraduates, ILR 100 and 101; graduate students, ILR 502.
G. Brooks, C. Daniel, I. DeVault, G. Korman, N. Salvatore
The areas of study are determined each semester by the instructor offering the seminar.

685 Collective Bargaining in Public Education  Spring 3 credits. Limited enrollment. Prerequisite: permission of instructor.
R. Doherty
The seminar consists of a study of the legal, financial, administrative, and educational problems raised by collective bargaining in the public schools. Major attention will be directed at existing statutes covering the employment of public employees, the content and the administration of collective agreements, the ideological postures of teacher organizations, and the resolution of negotiating issues that arise in small group and research projects will be required.

686 Collective Bargaining in the Public Sector  Fall or spring 3 credits.
Prerequisites: undergraduates, ILR 200 and 201; graduate students, ILR 500 and 501.
J. Burton, R. Donovan, P. Ross, R. Seебer
An examination of the development, practice, and extent of collective bargaining between federal, state, and local governments and their employees. The variety of legislative approaches to such matters as representation, collective labor agreement, unfair practices, scope of bargaining, impasse procedures, and the strike against government are considered along with implications of collective bargaining for public policy and its formulation.

687 Current Issues in Collective Bargaining Fall or spring 3 or 4 credits. Limited to 25 students. Prerequisite: ILR 200 or 500, and permission of instructor.
D. Cullen, D. Lipsky, P. Ross
An intensive study of the most significant current issues and problems facing employers and unions in their relations with each other, with particular emphasis on the substantive matters in contract negotiations and administration of the provisions of collective bargaining agreements. A major research paper is usually required.

688 The Political Economy of Collective Bargaining  Fall or spring 3 credits. Prerequisites: undergraduates, ILR 200 and 240; graduate students, ILR 500 and 540, or permission of instructor.
Focuses on both the economic analysis of unions and collective bargaining in our economy and the economic forces that affect collective bargaining. The method is to identify and conceptualize the structural determinants of relative bargaining power. On this basis, the course examines both the economic outcomes of collective bargaining and current bargaining trends in a variety of industries. Students will be required to write theoretical analyses of unionism (neoclassical, institutionalist) and to compare the statistical techniques and empirical results of research on the union effect on economics outcomes (wages, prices, inflation, profits, productivity, earnings inequality) are also evaluated. The effect of technology, corporate structures, and public policy on union bargaining power is outlined. A term paper is required.

689 Constitutional Aspects of Labor Law  Spring 3 credits. R. Lieberwitz
In-depth analysis of the Supreme Court decisions that interpret the United States Constitution as it applies in the workplace. This study will focus on the First Amendment, Fifth Amendment, Fourteenth Amendment, and Commerce Clause, with issues including freedom of speech and association, equal protection, due process, and other issues in the area of political and civil rights. The course entails a high level of student participation in class discussion, and assignments include a research paper.

703 Theory and Research in Collective Bargaining  Spring 3 credits. Open to graduate students who have had ILR 500 and 723 or their equivalents. Recommended: a statistics course beyond the level of ILR 510.
D. Lipsky, R. Seебer
This is a second-level course in collective bargaining that builds on the institutional research covered in ILR 500. The existing literature in the area of collective bargaining is appraised for its theoretical and empirical content. Efforts are made to explore the appropriate role for theory and empirical analysis in moving research in collective bargaining toward a more analytical perspective and to identify and appraise the underlying collective bargaining used to study collective bargaining-related issues.

705 The Economics of Collective Bargaining  Fall or spring 3 credits. Prerequisites: undergraduates, ILR 500; graduate students, ILR 540 (or their equivalents) and an understanding of multiple regression analysis; or permission of instructor. H. Katz, D. Lipsky
Focuses on both the economic analysis of unions and collective bargaining in our economy and the economic forces that affect collective bargaining. The method is to identify and conceptualize the structural determinants of relative bargaining power. On this basis, the course examines both the economic outcomes of collective bargaining and current bargaining trends in a variety of industries. Students will be required to write theoretical analyses of unionism (neoclassical, institutionalist) and to compare the statistical techniques and empirical results of research on the union effect on economics outcomes (wages, prices, inflation, profits, productivity, earnings inequality) are also evaluated. The effect of technology, corporate structures, and public policy on union bargaining power is outlined. A term paper is required.

784 Employment Discrimination and the Law  Fall 4 credits. Prerequisite: ILR 501 or equivalent.
T. Crivens, M. Gold
An examination of legal problems involving employment discrimination based on race, color, religion, sex, national origin or age. The impact of developing principles of law on preemployment inquiries and testing, seniority and promotions and other personnel policies, and practices and procedures are discussed. The requirements of affirmative action under Executive Order 11246, as amended, are analyzed. Special attention is given to the role of state law in resolving employment discrimination claims and the procedural framework for raising and adjudicating such claims before administrative agencies and the courts.

798 Internship  Fall or spring 1-3 credits. Designed to grant credit for any research under direction of a faculty member by graduate students who have been selected for an internship. All requests for permission to register for ILR 798 must be approved by the faculty member who will supervise the project.

799 Directed Studies  Fall or spring. Credit to be arranged.
For individual research conducted under the direction of a member of the faculty.

790 Workshop in Collective Bargaining, Labor Law, and Labor History  Spring 3 credits. Enrollment limited to M.S. and Ph.D. candidates in the department. S-U grades only.
Staff
This workshop is designed to provide a forum for the presentation of current research being undertaken by faculty members and graduate students in the
Department of Collective Bargaining and by invited guests. All M.S. and Ph.D. candidates in the department who are at work on their theses are strongly urged to enroll. Each student in the course will be expected to make at least one presentation during the year, focusing on the formulation, design, execution, and results of that student's thesis research.

Economic and Social Statistics

P. McCarthy, chairman; I. Blumen, A. Hadi, P. Velleman.

210 Statistical Reasoning I Fall or spring. 4 credits. Not open to engineering or graduate students. Attendance at the first discussion section of the term is essential. An introduction to the basic concepts of statistics: measures of location and dispersion, estimation and confidence intervals, hypothesis tests, regression and correlation. Students are taught to use a computer at the beginning of the term and use it for weekly assignments.

211 Statistical Reasoning II Fall. 3 credits. Prerequisite: I&LR 210 or suitable introductory statistics course. Attendance at the first discussion section of the term is essential. A continuation of I&LR 210. Application of statistical techniques to the social sciences. Topics include statistical inference, simple and multiple regression and correlation, applications of regression, elements of time series analysis, and the design of sample surveys. A computer is used throughout the course. (Students who have taken an introductory course in statistics without a computer will be expected to obtain remedial instruction during the first few weeks of the semester.)

310 Design of Sample Surveys Spring. 3 credits. Prerequisite: one term of statistics. Application of statistical methods to the sampling of human populations. A thorough treatment of the concepts and problems of sample design with respect to cost, procedures of estimation, and measurement of sampling error. Analysis of nonsampling errors and their effects on survey results (for example, interviewer bias and response error). Illustrative materials are drawn from such fields as market research and attitude and opinion research.

[311 Statistics II Fall. 4 credits. Prerequisite: I&LR 210 or permission of instructor. Not offered 1987-88. An intermediate, nonmathematical statistics course emphasizing the concepts associated with statistical methods. Includes a treatment of estimation and tests of hypotheses with reasons for choice of various methods and models. Application to problems involving percentages, means, variances, and correlation coefficients, with an introduction to nonparametric methods, analysis of variance, and multiple regression and correlation.)

312 Applied Regression Methods Fall. 3 credits. Prerequisite: I&LR 211 or equivalent. A. Hadi.

The course starts with a review of those parts of matrix algebra that provide the vocabulary and skill necessary to construct and manipulate linear regression models. The standard least-squares theory is then developed, and regression analysis techniques are applied to problems arising in economics, industry, government, and the social sciences. Computer packages are used as an aid to obtain problem solutions. Additional topics are deviation from assumptions, multicollinearity, variable selection methods, and analysis of variance.

410 Techniques of Multivariate Analysis Fall. 3 credits. Prerequisite: I&LR 311. The techniques of multivariate statistical analysis, the associated assumptions, the rationale for choices among techniques, and illustrative applications. Some matrix algebra and related mathematics are introduced. Includes regression, correlation, principle components, multivariate tests on means, variances and covariances, relations between sets of variates, and discriminatory analysis.

411 Statistical Analysis of Qualitative Data Spring. 3 credits. Prerequisite: I&LR 311. I. Blumen. An advanced undergraduate and beginning graduate course. Includes treatment of association between qualitative variates, paired comparisons, rank-order methods, and other nonparametric statistical techniques, including those related to chi-squared.

499 Directed Studies For description, see the section on Collective Bargaining, Labor Law, and Labor History.

510 Statistical Methods for the Social Sciences I Fall or summer. 4 credits. A nonmathematical course for graduate students in the social sciences without previous training in statistical method. Emphasis is on discussion of technical aspects of statistical analysis and on initiative in selecting and applying statistical methods to research problems. The subjects ordinarily covered include analysis of frequency distributions, regression and correlation analysis, and selected topics from the area of statistical inference. Students are taught to use a computer at the beginning of the term and use it for weekly assignments.

511 Statistical Methods for the Social Sciences II Spring. 3 credits. Prerequisite: I&LR 510 or an equivalent introductory statistics course. This is a second course in statistics for graduate students that emphasizes applications in the social sciences. Topics include review of simple linear regression, multiple regression (theory, model building, model violations), and analysis of variance. Statistical computing packages are used extensively. (Students who have taken an introductory course in statistics without a computer will be expected to obtain remedial instruction during the first few weeks of the semester.)

610 Seminar in Modern Data Analysis Fall. 3 credits. Prerequisite: I&LR 311 or equivalent. P. Velleman. An advanced survey of modern data analysis methods. Topics include exploratory data analysis, robust methods, regression methods, and diagnostics. Extensive outside readings cover recent and historical work. Participant's knowledge of multiple regression, including the use of matrices (Statistics and Biomtery 416 may be taken concurrently), and some experience using a computer.

711 Sensitivity Analysis in Linear Regression Spring. 3 credits. Prerequisite: I&LR 312 or equivalent. A. Hadi. This course is an attempt to narrow the gap between the theory and practical application of the linear regression model. Classical and recently developed statistical procedures are discussed. Students will be expected to do extensive analysis of real-life data sets using computer-packaged programs. Topics include regression diagnostics (outliers, leverage points, influential observations), generalized linear models, and multicollinearity.

712 Theory of Sampling Fall. 3 credits. Prerequisite: calculus and at least one semester of mathematical statistics. A companion course to I&LR 310, Design of Sample Surveys, stressing the development of the fundamentals of sampling theory. Attention is paid to recent progress in the field. Occasional illustrative material is given to indicate the application of the theory.

799 Directed Studies For description see the section on Collective Bargaining, Labor Law, and Labor History.

International and Comparative Labor Relations

G. Fields, chairman; M. G. Clark, W. Galenson, J. Windmuller.

330 Comparative Industrial Relations Systems: Western Europe Fall. 3 credits. (1 additional credit may be arranged with the instructor.) Open to juniors and seniors.

J. Windmuller.

An introduction to contemporary industrial relations in several Western industrialized countries, including Britain, France, West Germany, and Sweden. The emphasis will be on trade unions, employers and their associations, collective bargaining, the role of government, and current policy issues.

[331 Comparative Industrial Relations Systems: Non-Western Countries Spring. 3 credits (1 additional credit may be arranged with the instructor.) Open to juniors and seniors. Not offered 1987-88.

J. Windmuller.

A study of the industrial relations systems of less-developed countries and industrialized non-Western countries, including Japan, the Soviet Union, Yugoslavia, India, and several others. Emphasis is on government labor policies, trade unions, and collective bargaining. Also included is a review of international organizations concerned with labor problems.)

332 Labor in Developing Economies Spring. 3 credits. G. Fields.

The economic problems of labor in less-developed nations. Among the subjects included are determinants of income and wage structures in less-developed countries; labor demand and unemployment; labor supply and migration; human resource policy; and development strategy and employment growth.

[430 European Labor History Fall. 3 credits. Not offered 1987-88.

J. Windmuller.

The development of trade unions in Great Britain, France, and Germany between 1850 and 1950. Patterns of union organization, political party—trade union links, the growth of industrial relations systems, and the evolution of public policies toward labor are emphasized.)

499 Directed Studies For description see the section on Collective Bargaining, Labor Law, and Labor History.

530 Comparative Industrial Relations Systems: Western Europe Fall. 3 credits. For graduate students.

J. Windmuller.

Students in this course attend the lectures in I&LR 330 (see description for I&LR 330). If enrollment warrants, they will also meet separately at a time to be arranged for discussion of topics in I&LR 330 and related topics.

[531 Comparative Industrial Relations Systems: Non-Western Countries Spring. 3 credits. For graduate students. Not offered 1987-88.

J. Windmuller.

Students in this course attend the lectures in I&LR 331 (see description for I&LR 331). If enrollment warrants, they will also meet separately at a time to be arranged for discussion of topics in I&LR 331 and related topics.)

532 Labor in Developing Economies Spring. 3 credits. G. Fields.

Students in this course attend the lectures in I&LR 332 (see description for I&LR 332). If enrollment warrants, they will also meet separately at a time to be arranged for discussion of topics in I&LR 332 and additional topics.
Labor Economics


340 Development of Economic Institutions
Spring. 3 credits. Prerequisite for non-ILR students: permission of instructor.
G. Boyer
This course focuses on the historical roots of the economic system currently dominant in Western Europe and the United States. It begins with an examination of the process of European economic growth prior to 1914, the economic system of industry and labor.

345 Honors Program
Fall and spring (yearlong course), 3 credits each term.
For description see the section on Collective Bargaining, Labor Law, and Labor History.

497-498 Internship
Fall or spring, 3 and 6 credits.
For description see the section on Collective Bargaining, Labor Law, and Labor History.

499 Directed Studies
For description see the section on Collective Bargaining, Labor Law, and Labor History.

540 Labor Economics
Fall or summer. 3 credits. Prerequisites: Economics 101–102 or equivalent.
Required of graduate students majoring or minoring in labor economics and M.I.L.R. candidates.
R. Hutchens
This course analyzes the characteristics and problems of the labor market by application to them the theory and elementary tools of economics. Behavior on both the demand (employer) and supply (employee) sides of the market is analyzed to gain a deeper understanding of the effects of various government programs targeted at the labor market. Topics covered include education and training, fringe benefits and the structure and regulation of compensation, labor-force participation and its relationship to household production, issues regarding occupational choice, an analysis of migration, labor-market discrimination, and the effects of unions.

541 Social Security and Labor Legislation
Spring. 3 credits. Normally required of graduate students majoring or minoring in labor economics and required of M.I.L.R. candidates.
R. Hutchens
This course focuses on the role of labor market parameters in the implementation of social security legislation.

640 The Economics of Employee Benefits
Fall. 3 credits. Open to upperclass and graduate students.
O. Mitchell
An analysis and appraisal of private health, welfare, and pension plans. Consideration of the origin and development of employer, union, and joint programs, a critical examination of the financing, administration, and general effectiveness of the plans.

645 Politics and Markets I
Fall. 4 credits. Prerequisite: Economics 311 or 313 or permission of instructor.
R. Frank
Focuses on applied microeconomic policy issues as a vehicle for studying the strengths and weaknesses of the market system. Topics covered includeorney discrimination, public goods, monopoly, economic regulation, and health and safety regulation.

646 Economics of Discrimination
Fall or spring. 3 credits. Not offered 1987–88.
O. Mitchell
This course examines differences in labor market rewards by gender, race, age, and other worker characteristics from both a theoretical and an empirical perspective. Economic measurement and statistical methodology (including computer analysis) are stressed. The course is aimed at advanced undergraduates and graduate students with some background in microeconomics and data analysis.

647 Evaluation of Social Programs
Fall. 4 credits. Prerequisite: Economics 351.
R. Ehrenberg
An introduction to the methodologies used by economists to evaluate the impact of social-action programs and legislation. General evaluation methodology, cost-benefit analysis, and econometrics are discussed. Case studies are used to illustrate the uses of these techniques, to acquaint the student with major current government programs and legislation, and to estimate these programs' economic impacts. Throughout, the primary analytic framework used by the instructor is microeconomics.

744 Seminar in Labor Economics
Fall. 3 credits. Intended for Ph.D. students who have started work on theses or dissertations. Preliminary plans and portions of completed work are presented for discussion.
Reading and discussion of selected topics in labor economics. Applications of economic theory and econometrics to the labor market and human resource areas.

745 Seminar in Labor Economics
Spring. 3 credits.
Reading and discussion of selected topics in labor economics. Applications of economic theory and econometrics to the labor market and human resource areas.

798 Internship
For description see the section on Collective Bargaining, Labor Law, and Labor History.

799 Directed Studies
For description see the section on Collective Bargaining, Labor Law, and Labor History.

940 Workshop in Labor Economics
Fall or spring. 3 credits. Designed for Ph.D. students who have started to write their dissertations.
Focus is on the formulation, design, and execution of dissertations. Preliminary plans and portions of completed work are presented for discussion.

Organizational Behavior
R. Stern, chairman; S. Bacharach, S. Barley, L. Gruenfeld, T. Hammer, P. Bilbert, H. Rice, L. Williams
120 Introduction to Macro Organizational Behavior and Analysis Fall. 3 credits. Staff. The relationship between industry and the economy as a whole and its implications for other social institutions in American society (including stratification, politics, and American values) is discussed. The nature of industrial organization and social psychological processes as need satisfaction, perception, attitude formation, and decision making. The individual is described and examined as a formal and informal group member. Within this area, particular emphasis is placed on leadership, problem solving, and conflict resolution.

121 Introduction to Micro Organizational Behavior and Analysis Spring or summer. 3 credits. Staff. Deals with the relationship between the individual and the organization. Topics include basic psychological processes as need satisfaction, perception, attitude formation, and decision making. The individual is described and examined as a formal and informal group member. Within this area, particular emphasis is placed on leadership, problem solving, and conflict resolution.

222 Studies in Organizational Behavior: Regulating the Corporation Fall or summer. 3 credits. R. Stern. The course will examine public and private power from an organizational perspective. The resource-dependence approach to organization-environment relations provides a framework for interpreting government attempts at the regulation of corporate behavior. Topics cover the structure and functioning of government regulatory agencies and corporate responses to regulation, including corporate strategy, change, and political influence. The role of interest groups such as consumer or citizens organizations is also considered. Research and case materials focus on the implementation of environmental protection, occupational health and safety, equal opportunity, antitrust, and rate-setting regulations.

320 The Psychology of Industrial Engineering Fall. 4 credits. T. Hammer. A study of the human factors in the industrial engineering of work, workplaces, tools, and machinery. The course examines the aspects of individual and social psychology that operate in the work setting and that should be taken into account in the design of jobs. These include limitations of the human sensory system; individual difference in skills, abilities, motives, and needs; group dynamics; intrinsic motivation; job satisfaction; conflict.

322 Comparative Theories of Organizational Behavior and Social Character Fall. 3 credits. L. Gruenfeld. A comparative social-psychological approach is used to examine theories of work, authority, conflict, and change in employment organization.

323 Introduction to the Study of Attitudes Fall. 4 credits. Open to juniors and seniors. Staff. Designed to acquaint the student with what is known about (1) origins of human attitudes, (2) the determinants of attitude change, and (3) the measurement of attitude differences. Studies employing clinical, experimental, and survey techniques are discussed. Each student designs, executes, and analyzes his or her own research study.

324 Work Organizations, Troubled Employees, and Employee Assistance Programs Spring. 3 credits. Limited to 40 students. Prerequisite: one or more courses in sociology and psychology. H. Trice. Focus is on the relationship between organizational life and psychiatric-criminal behavior. Covers (1) the nature and etiology of psychiatric disorders such as alcoholism, other drug and substance abuse, and the major neuroses; (2) corporate and white-collar criminal behavior; (3) the role of occupational and organizational risk factors in etiology; (4) various types of organizations that represent societal responses to troubled employees—mental hospitals, prisons, jails, halfway houses, shelter workshops, and self-help groups such as Alcoholics Anonymous. Puts differential emphasis on programs within work organizations that attempt to deal with troubled employees, job-based approaches, and employee assistance programs. Field format divides class into small groups for application in local relevant organizations. The development, strategies, and management of employee assistance programs will receive special attention.

325 Organizations and Social Inequality Spring. 4 credits. Examines the central role that organizations in industrial societies play in allocating income, status, and other resources to individuals. Marxist conceptions of class and Weberian conceptions of job authority will be examined to see what additional power they add to the explanation of social inequality, particularly in regard to income attainment. As the central unit of analysis in the course will be organizations, a historical section will be included that deals with the evolution of current control and compensation structures in large-scale organizations.

326 Sociology of Occupations Fall or spring. 3 credits. Limited to 45 students. Prerequisite: one or more courses in sociology. H. Trice. Focuses on (1) the societal characteristics of occupations: division of labor, social stratification, mandate and license, occupational ideologies, stories, and tradition; (2) nature and expression of professionalism of occupations; (3) occupational characteristics of occupations: accommodation to formal organizations, occupational associations, and occupational mix; (4) social psychological characteristics of occupations: temperament and intuitive role-taking, attraction, identity, and commitment, and occupational self-images; (5) relationship between occupational structure and organizational structure. Field format divides class into small groups for application among local occupational groups.

327 Psychology of Industrial Conflict Fall. 4 credits. Staff. An application of frustration theory to the analysis of conflict and stress in organizations and society. Comparisons are made between industrial relations, race relations, social movements, and other settings. Readings include behavioral research findings from a variety of studies in industry. Relevant contributions from experimental, social, and clinical psychology are also considered.

328 Cooperation, Competition, and Conflict Resolution Spring. 4 credits. Prerequisite: two courses in social psychology or equivalent. An examination of theory and empirical evidence relating to the resolution of interpersonal, intergroup, and international conflict. Specific attention is devoted to studying factors that contribute to the development of cooperative or competitive bonds between parties to a conflict. The following topics are studied: the availability and use of threat; the credibility, intensity, and costs of threat; fractioning and escalating conflict. Personality and situational factors that regulate conflict intensification are stressed.

329 Organizational Cultures Fall or spring. 3 credits. Limited to 45 students. Prerequisites: one or more courses in sociology. H. Trice. This course reviews the concept of culture as it has evolved in sociology and anthropology, applying it to formal organizations in workplaces such as corporations and unions. The course first examines the nature of ideologies as sense-making definitions of behavior, concentrating on the cultural forms that carry these cultural messages, rituals, symbols, myths, sagas, legends, and organizational stories. Considerable attention will be given to rites and ceremonials as a cultural form in organizational life that consolidates many of these expressive forms into one. The course will examine types of ceremonial behavior such as rites of passage, rites of enhancement, and rites of degradation, including the role of language-arts, physical settings, and ceremonial behavior. The presence of subcultures and countercultures in organizational behavior will also receive attention, especially the part played by occupational subcultures in formal organizations. Emphasis will be placed on empirical examples from both the organizational behavior literature and the professor's field research. Field format divides class into small groups for application in local relevant organizations.

370 The Study of Work Motivation Fall. 4 credits. Open to juniors and seniors with permission of instructor. Staff. Designed to acquaint the student with the basic concepts and theories of human motivation, with implications for organizational behavior. Focus is on theories of worker motivation and research approaches and results as these apply to individuals and groups in formal organizations. Readings are predicated on the faculty's field of organizational psychology, supplemented by relevant contributions from experimental, social, and clinical psychology. Each student will design, execute, and analyze a research study of his or her own.

371 Individual Differences and Organizational Behavior Fall or summer. 4 credits. Recommended: some acquaintance with the substance and methods of behavioral or social science. L. Gruenfeld. This course examines personality from both a cultural and an individualistic point of view. Social behavior, authority relationships, and work motivation are used to illustrate how various theories could be applied to understand behavior and experience in organizations. Communal (expressive), corporate (instrumental), and coercive (power) strategies of adaptation are examined and contrasted.

372 Sociological Models of Organizations Spring. 3 credits. Prerequisites: I&LR 120 and 121 or equivalent. P. Tolbert. Introduces students to the basic issues involved in the sociological analysis of organizations. Traces organizational theory by Max Weber to the most recent research. Among the themes to be discussed are internal structure of organizations, communication in organizations, the development of technologies and organizational change, organizational technology, and organizational environment.

373 Organizational Behavior Simulations Fall. 3 credits. Prerequisite: I&LR 120 and 121 or equivalent. R. Stern. Basic principles of organizational behavior are studied through readings and participation in three simulation games. The first game, The Organizational Game: Design, Change, and Development, by Miles and Randoph, simulates traditional organization while the second, The Fuzzy Game, by Paton and Lockett, simulates a cooperative. A third game models executive decision making. Organizational design, decision making, and conflict are the central topics of discussion. The contrasting bases of power in the organizations permits the study of the assumptions underlying organization structure and process.

374 Technology and the Worker Fall. 3 credits. S. Bailey. Examines theory and research pertaining to the social implications of technology and technological change for the workplace and the worker. Focus is on blue-collar and professional workers. At issue are alternative conceptions of technology as a social phenomenon, approaches to
the study of the technology in the workplace, the reactions of individuals and groups to technological change, the construction of a technology's social meaning, and the management of technological change. A broad range of technologies will be considered, but particular emphasis will be given to automation, electronic data processing, and sophisticated microelectronic technologies, including CAD-CAM systems, telecommunication networks, medical imaging technologies, artificial intelligence, and personal computers.

420 Group Processes Fall. 4 credits L. Gruenfeld
Several conceptual and methodological approaches are applied to the observation of personality in groups. Students observe, analyze, and quantify behavior in ongoing groups. Emphasis is on systematic observation of interpersonal behavior in open field groups rather than contrived experimental groups.

423 Evaluation of Social Action Programs Fall or spring. 3 credits H. Trice
A consideration of the principles and strategies involved in evaluating research, experimental research designs, process evaluation, and adaptations of cost benefits and cost efficiency to determine the extent to which intervention programs in fields such as training and therapy accomplish their goals. The adoption of these strategies to large social contexts such as child guidance clinics, mental health clinics, and programs in the poverty areas, such as Head Start, is considered. Includes fieldwork and emphasizes assessment of program implementation.

424 Study of Public Sector Bureaucracy Spring 3 credits. Prerequisite: permission of instructor S. Bacharach
Field research in public sector organization such as a school bureaucracy or a social welfare bureaucracy. Students conduct a major study into which they integrate theories from organizational theory. Theoretical issues such as decentralization, participation, and communication are discussed in the seminar.

425 Sociology of Industrial Conflict Spring 4 credits R. Stern
The focus is on the variety of theoretical and empirical evidence available on social, economic, and political causes of industrial conflict. The manifestations of conflict, such as strikes, labor turnover, absenteeism, and sabotage, and the influence of the environments in which they occur are emphasized.

426 Theories of Industrial Society Fall. 4 credits Prerequisite: I&LR 120 and permission of instructor S. Bacharach
Concentrates primarily on the works of Weber and Marx and will consist of readings in the original texts.

427 The Professions: Organization and Control Fall 4 credits P. Tolbert
Focus is on the sources of power and control exercised by professional groups in contemporary society. A number of issues will be examined in this context, including the role of professions in society, processes through which an occupational group becomes defined as a profession, sources of control that professional associations have over their members, relations between professionals and nonprofessionals in organizations, and the relationship between unionization and professionalization of occupations.

471 Organizational Analysis of Trade Unions Fall 3 credits. Prerequisite: I&LR 120 and 121 and one additional course in organizational behavior. R. Stern, T. Hammer
The course is designed to use organizational theory and research in the examination of trade unions. Studying trade unions as organizations includes discussion of the role of unions in contemporary society and the meaning of unions to individual members. Unions will be the unit of analysis in considering unions as agents of social change, unions in interorganizational relationships, and union political activity. Union members will be the focus in considering why people join unions, commitment to unions, dual allegiance problems, and leadership. The course will also address the issue of how effective unions are in providing worker participation in management decision-making. Course material focuses on current research on unions and on strategies for further research.

472 Applied Organizational Behavior Fall 3 credits. Prerequisites: I&LR 120 and 121 S. Bacharach
Introduces students to intermediate theory of organizational behavior. It will specifically concentrate on teaching students to use organizational theories for analytical and applied purposes. Among the issues to be addressed are organizational structure, work processes, organizational politics, organizational design, job design, incentive systems, and quality-of-work-life programs.

475 Organizational and Political Behavior in School Districts Fall. 4 credits Enrollment limited Prerequisite: permission of instructor S. Bacharach
This course is intended to provide students with research experience through the study of the administrative and governance processes in school districts. The students will be required to work with a school district and union personnel while investigating the following areas: (a) structure and process of decision making in urban and rural school districts, (b) organizational conflict as reflected in school board meetings, (c) the variations in, and effect of, leadership style, as evidenced by different superintendents' advisory techniques, (d) the collective bargaining process as reflected in teacher contracts and actual negotiations, (e) the effect of the Taylor Law on the structure and process of decision making in school districts, and (f) the effects of administrative law on conflict in school districts. Students will be responsible for the collection of data and the presentation of a final report of their project.

476 Unions and Public Policy in School Districts Spring. 4 credits Enrollment limited Prerequisite: permission of instructor S. Bacharach
A continuation of I&LR 475, but 476 is not a prerequisite. This course is a research field seminar. Students will be required to work with school districts and union personnel while investigating the following areas: (a) labor contracts with school districts, (b) relations between teachers' unions, school boards, and superintendents, (c) teachers' unions' involvement with school district policies.

478 Applied Topics in Organizational Behavior Fall 4 credits. Prerequisite: two courses in organizational behavior beyond the 100 level L. Williams
Reading and classroom discussion will be devoted to each of three topics. The topics are industrial gerontology, with a particular focus on retirement; technology and the office; and gender and personality as organizational variables. Readings will be primarily from journal articles. Students will have a research task for each topic.

499 Directed Studies For description see the section on Collective Bargaining, Labor Law, and Labor History.

520 Micro Organizational Behavior and Analysis Fall or summer. 3 credits Staff
Survey of concepts, theories, and research from the fields of organizational and social psychology as these relate to the behavior of individuals and groups in organizations. Job attitudes, motivation, performance, leadership and power, group formation, perception, and organizational climate. A preliminary course for advanced work in organizational behavior.

521 Macro Organizational Behavior and Analysis Spring. 3 credits Staff
Formal organizations are studied from the perspectives of classical organization theory, human relations theory, and contemporary and cross-cultural analysis. Contemporary theories and quantitative approaches to organizational structure are also considered in some detail. Intended to be preliminary to more intensive work in organizational behavior.

620 Theories of Organizational Change, Innovation, and Evaluation Spring 4 credits. Prerequisite: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology H. Trice
This seminar examines the dynamics of individual, structural, and environmental change in formal organizations. The role of evaluative research in assessing the effectiveness of the implementation of innovations and in determining organizational effectiveness are analyzed. Several case studies of organizational change in government, unions, and private industry are examined. The emphasis is on conceptual frameworks for analyzing organizational change and mounting evaluative research on innovations. Readings are interdisciplinary and include sociology, psychology, and political science.

621 Organizational Diagnosis and Intervention Development Spring 4 credits. Prerequisites: I&LR 120 and 121, graduate students, I&LR 520 and 521 or equivalent, and permission of instructor L. Gruenfeld
This applied course considers theories and techniques for the identification and improvement of organizational problems at the behavioral (micro) level. Methods for the implementing of change are evaluated in the light of several normative and descriptive theories of individual and group development and effectiveness. The course emphasizes both quantitative and qualitative data processing techniques.

622 Organizations and Environments. Spring 3 credits P. Tolbert
This course will survey the literature on organization-environment relations, including work on organizational dependence and power, management of uncertainty, and other aspects of interorganizational cooperation and conflict. The objective of the course is to provide students with a general theoretical understanding of the way in which organizations can shape their environment and in which the environment constrains and shapes organizations.

624 Groups in Work Organizations Fall 4 credits Enrollment limited. Prerequisite: Senior standing, and I&LR 371 or I&LR 629 or equivalent, or permission of instructor L. Gruenfeld
This is an applied social psychology course that emphasizes the building and mediation of purposeful groups working in formal organizations. The
course deals with models and variables that interact with group cohesion and performance. Structural, environmental, task, motivational, and interpersonal variables are considered. This course work includes observation and analysis of decision making and negotiating behavior in a group.

625 Labor and Monopoly Capital: The Growth of Large United States Firms in the Past Century
Spring. 7 weeks only. 2 credits.
Staff.
A critical review of two recent books with very different explanations for the rise of large, hierarchically differentiated corporations in the United States: Harry Braverman, Labor and Monopoly Capital, and Alfred D. Chandler, The Visible Hand. These books are supplemented on patterns of industrialization and internal structural transformation of large firms in the United States economy.

626 Science and Innovation in Industry
Fall. 3 credits. Prerequisites: ILR 120 or 121 for ILR undergraduates; ILR 520 or 521 for ILR graduate students; or permission of instructor for out-of-college students.
S. Bailey.
This course seeks to impart an understanding of how industrial R&D is organized, as well as an appreciation for the practical problems that arise when firms employ a significant number of researchers, engineers, and other technical workers. It is designed for students who have a general research interest in industrial R&D or who anticipate working for firms in which R&D plays an important role. The course will bring relevant theoretical perspectives to bear on pragmatic issues surrounding technical innovation and the employment of scientists and engineers. Representative topics include the organizational behavior of scientific and technical communities, the industrialization of research, the nature of scientific and technical work, new patterns of industrial relations, and the careers of scientists and engineers.

627 Leadership in Organizations
Spring. 3 credits. Prerequisites: two organizational behavior courses at the 300 level or advanced courses in sociology or psychology.
L. Gruenfeld.
An examination of theories and research findings from the behavioral sciences that are relevant to leadership and the influence process in groups and organizations. Personal, social, intergroup, and interpersonal perception, as well as motivation to lead and to follow will be discussed. The implications for leadership training, organization development, and action research are explored.

628 Cross-Cultural Studies of Organizational Behavior
Fall or spring. 3 credits. Designed for graduate students interested in research and sociopsychological theory at the workplace.
Undergraduates with permission of instructor.
L. Gruenfeld.
How organizational behavior is affected by age (generational), sex, social class, and cultural variables. Both theoretical and research-related issues pertaining to these variables are explored to illustrate the social, psychological, and cultural explanations for age differences in job satisfaction and performance. What can be inferred from studies that ignore age (sex, social class, and cultural) differences? What are the causes and patterns, both subjective and objective, for age and other kinds of discrimination?

629 Personality in Organization
Fall. 4 credits.
Open to undergraduates with permission of instructor.
L. Gruenfeld.
This advanced course considers psychodynamic theories of organizational diagnosis at the individual group level with topics including leadership, power, authority, work motivation, intervention, and change. The topics are discussed and applied in small study groups. The professor's role is as a consultant and resource person. Class members study and research their own behavior and present their qualitative and quantitative findings to the class. Students are expected to have background and interest in both research methods and theory.

673 Cross-Cultural Explorations of Individual Differences
Fall. 3 credits.
A data-bank analysis of the relationship between socioeconomic status, socialization values, ethnicity, and various indices of individual differences, such as intelligence, proclivity to take risks, self-concept, cognitive style, and job preferences.

674 Social Regulation and Control of Institutions
Spring. 7 weeks only. 2 credits. Prerequisites: two organizational behavior courses at the 300 level, or advanced courses in sociology or psychology.
R. Stern.
Interorganizational relations are examined in terms of network control agents and target objects. The dynamics of control relationships based on political bargaining, the distribution of power, economic rewards and costs, and historical circumstances are examined in the context of their evolution through organizational adaptation to the environment. Subject matter includes theories of organizational change and application of a control perspective to the institutions of American business, government regulations, athletics, and education.

675 Cooperative Strategies for Improving Organizational Performance
Spring. 4 credits.
M. Gaffney.
The course will concentrate on presentation and analysis of a series of case studies involving projects using cooperative strategies to improve organizational performance. Emphasis will be given to cases in which union and management have been working together to enhance productivity and the quality of working life. Cases will be examined against a background of the research literature on improving organizational performance. Students will be responsible for a term paper.

676 Systems of Labor Participation in Management
Fall. 4 credits. Limited to 25 students.
Prerequisite: senior standing and permission of instructor.
T. Hammer.
Examines the theory and practice of worker participation in systems ranging from informal shop-level participation to self-management. Special emphasis is placed on the systemic design and work restructuring that give workers control over the labor process. Attention is also given to legislated programs of participation (codetermination) and to participation in employee-owned firms.

677 Seminar in Field Research
Fall. 4 credits.
Enrollment limited. Prerequisite: permission of instructor.
H. Trice.
Recent research efforts are examined and the dynamic nature of the research process is emphasized. The research sequence and methodology are discussed, as well as other problems of gaining and sustaining rapport, the initial development of research interviews and observation data, and their conversion to quantitative instruments. Participants share in the exploration of appropriate needs of M.S. and Ph.D. candidates majoring in organizational behavior, but other graduate students may enroll.
L. Williams.
Materials studied in ILR 723 and 724 include (1) theoretical, conceptual, and ethical questions; (2) survey research and attitude-scaling procedures; (3) laboratory research methods; (4) participant observation and interview methods; (5) use of documents and qualitative data analysis. Provides students with important philosophical background for doing research and exposes them to a well-balanced, interdisciplinary set of quantitative and qualitative research tools.

678 Seminar in Field Research II
Spring. 4 credits. Prerequisites: ILR 677 and permission of instructor.
H. Trice.
Coordination of recent research efforts is examined, and the dynamic nature of the research process is emphasized. The realities of field research are explored, including problems of gaining and sustaining rapport, the initial development of research interviews and observation data; and their conversion to data analysis and interpretation through the study of psychometric theory, (b) traditional problems encountered in the assessment of human and organizational characteristics, (c) the use of different methods of data analysis, and (d) an examination of the limitations imposed on data analysis and interpretation by traditional measures. Examples of topics covered in the course: the use of Chi-square, t-tests, ANOVA, simple and multiple correlation and regression, reliability and validity analyses, causal models, factor analysis, scale construction.

725 Analysis of Published Research in Organizational Behavior
Fall. 3 credits.
Prerequisites: ILR 520–521 and one year of statistics.
R. Stern.
An advanced research methods course that critically examines published research papers in the field of organizational behavior in terms of research design and method as well as theory.
726 Organizational Behavior III Fall. 3 credits. Prerequisites: ILR 520 and 521 and permission of instructor.

S. Bailey

An advanced proseminar that seeks to develop an interdisciplinary perspective on selected topics in organizational behavior. The topics themselves will change from year to year depending on participants' interests. Course is designed to allow students and the instructor to jointly pursue significant scholarly inquiry into one or more arenas of organizational theory. Emphasis will be placed on exploring the relevance of tradition in related disciplines (anthropology, linguistics, philosophy, sociology, etc.) that may enrich our understanding of organizational life.

727 Work and Industrial Conflict Spring, weeks 7–14. 2 credits.

R. Stern

A concentrated examination of the sociology of industrial conflict. The seminar focuses on classic formulations of conflict theory in sociology, then the social, political, economic causes of industrial conflict. Forms of conflict to be studied include strikes, turnover, absenteeism, and sabotage. Some discussion of the implications of various types of worker-management of firms for industrial conflict will be included.

728 Theories of Motivation and Leadership Spring. 2 or 4 credits. Prerequisite: ILR 520–521.

T. Hammer.

Two independent but sequence-connected minicourses.

(1) Theories of Work Motivation. 7 weeks. 2 credits. T. Hammer.

Course will provide an introduction to basic concepts of human motivation in general, with particular emphasis on the theories that explain and predict work motivation. Students will examine the empirical research that tests the validity of the theories and shows how and under what conditions different motivation models can be used in practice in work organizations.

(2) Theories of Leadership and Power. 7 weeks. 2 credits.

L. Gruenfeld.

Several current microtheories of leadership-power and related research are examined. The disciplinary perspective employed is social psychology and the level of analysis emphasized is action and experience of individuals in groups.

729 Organizational Change and Intervention Fall. 3 credits. Graduate students only; no exceptions.

L. Williams.

This seminar is concerned with planned and unplanned change in organizations. It is designed to analyze theory in practice. Particular attention will be paid to the role of internal and external change agents. Several applied research programs such as the Center for Creative Leadership, Tavistock, and SRC will also be examined.

798 Internship

For description see the section on Collective Bargaining, Labor Law, and Labor History.

799 Directed Studies

For description see the section on Collective Bargaining, Labor Law, and Labor History.

920 Organizational Behavior Workshop Fall. 2 credits. Limited to M.S. and Ph.D. candidates in the department. S-U grades only.

T. Hammer; R. Stern.

This workshop is designed to provide a forum for the presentation of current research undertaken by faculty members and graduate students in the Department of Organizational Behavior and by invited guests. All M.S. and Ph.D. candidates in the department who are at work on their theses are strongly urged to enroll. Each student in the course will be expected to make at least one presentation during the year, focusing on the formulation, design, execution, and results of that student's thesis research.

Personnel and Human Resource Studies

781 Personnel Skills and Human Resource Management Studies Fall. 3 credits. Prerequisites: ILR 260 or equivalent.

R. Risley, chairman; J. Bishop; J. Boudreau; V. Briggs; L. Dyer; F. Foltman; W. Frank; B. Gerhart; G. Milkovich; F. Miller; S. Rynes; W. Wasmuth

260 Personnel Management Fall or spring. 3 credits. Open only to ILR students. Non–ILR students may take ILR 151.

Staff.

An introductory overview of the management of human resources from an institutional perspective. Topics include human resource planning, organization, staffing, employee development, work-system rewards, and employee relations. Emphasis is on (a) problem-solving and decision-making approaches; (b) operational methods, technologies, and practices; (c) application of relevant behavioral science theory and research; and (d) legislation and other environmental constraints having an important bearing on the effective utilization of human resources by an enterprise.

266 Personal Computer Basics Fall or spring. 2 credits. Limited to 20 students.

R. Gerhart.

This 7-week course provides basic skills in the use of IBM personal computers (PCs). It covers basic hardware, terminology, fundamentals of the Disk Operating System, LOTUS 1-2-3, and DBASE III Plus. Emphasis is placed on hands-on experience using examples demonstrating human resource issues and PC-based solutions. This course is a prerequisite to several advanced Human Resource Management electives (e.g., ILR 694, Personal Computer Applications to Human Resource Management; ILR 666, Cost Benefit Analysis for Human Resource Management, and ILR 690, Personnel Information Systems).

360 Human Resource Economics and Public Policy Fall or spring. 3 credits. Open to sophomores, juniors, and seniors.

V. Briggs; J. Bishop.

A review of contemporary labor-market trends and theories pertaining to public efforts to develop the employment potential of the nation's human resources. Changes in the "older" programs in apprenticeship, vocational education, and vocational rehabilitation, as well as the "new" training programs, are studied. Special policy issues pertaining to youth, rural workers, welfare reform, job creation, worker relocation, economic development, targeted tax credits, industrial policy, and "enterprise zone" proposals will be examined. Comparisons are made with European initiatives.

361 Effective Supervision Fall or summer. 3 credits. Limited to juniors and seniors.

Prerequisite: ILR 260 or equivalent.

W. Wasmuth.

This course covers twenty-five major topics that make a critical difference in the life of a newly appointed or experienced supervisor. Theoretical and real-life case examples are provided from office, factory, union, nonunion, large, and small organizations and cover technical, psychological, social, and political issues at the supervisory level.

365 New York State Human Resource and Employee Relations Issues and Policies Fall or spring. 3 credits. Open to ILR students participating in an Albany internship.

J. Slocum.

This seminar will consider functions, current issues, and policy developments in New York State human resource development and employee relations. The role of the state in protective labor law administration; human resource programs; the function as a neutral party in labor disputes in the public and private sector; and legislation affecting employer-employee relations and economic development will be reviewed. Students will be assigned individual research topics that will be discussed in the seminar and developed into a term paper.

368 Women at Work Fall or spring. Variable 3 or 4 credits. Prerequisite: ILR 260 or equivalent.

F. Miller.

Various aspects of female occupational roles in twentieth-century United States. Historical, social, and legal factors that influence women's choice of careers; women's entry into and advancement in the workplace; socialization and training, and subsequent labor-market experience are considered. Working women's entry-level jobs, opportunities for advancement, and income are compared to men's.

369 Social Contract, 1964–1980 Fall or spring. 3 credits. Open to ILR students participating in Washington, D.C., internship.

S. Levitan.

The seminar will examine labor-market developments and their measurements, with emphasis on current social strategies to ameliorate social problems. The systematic relationships between the elements of various programs, their purposes, the institutional structures designed to carry them out, and the clients they were designed to serve will be explored. Topics stressed will relate to current national issues and priorities. Students will engage in individual projects on topics approved by the instructor.

469 Immigration and the American Labor Force Spring. 3 credits.

V. Briggs.

Assesses the role that immigration continues to play as a source of human resource development in the United States. The primary focus is on developments since the Immigration Act of 1965, the Refugee Act of 1980, and the Immigration Reform and Control Act of 1986. In addition to legal immigration, border commuters, the topics of illegal immigration, refugees, asylees, and nonimmigrant workers are also examined. Comparisons are also made with immigration systems of other nations. Public policy aspects are explored in depth.

495 Honors Program Fall and spring (yearlong course). 3 credits each term.

For description see the section on Collective Bargaining, Labor Law, and Labor History.

497–498 Internship Fall or spring. 3 and 6 credits.

For description see the section on Collective Bargaining, Labor Law, and Labor History.

499 Directed Studies

For description see the section on Collective Bargaining, Labor Law, and Labor History.

560 Personnel Management Fall or spring. 3 credits. Grads only.

Staff.

A survey course covering the major areas of the management of human behavior in work organizations. Consideration is given to such aspects of personnel work as job analysis, motivation, human resource planning, recruitment and selection, training, management development, organization development, compensation, and employee and labor relations. Emphasis is on the application of theory and research to the solution of personnel problems.

653 Personnel and Human Resource Management; Policy and Practices Fall. 3 credits.

Limited to 30 students, seniors and graduate students only.

Prerequisites: ILR 260/560, electives in personnel and human resource management, and permission of instructor.

R. Risley.

This seminar will be concerned with issues of current importance to leading practitioners and explore the policies and practices developed to meet organizational goals. Changing concepts of the P/HR function within organizations and new policies and
programs to meet changing needs will receive special attention. Outstanding leaders from the practitioner area will serve as guest seminar leaders during the term. Students will be required to do background reading for each topic as well as read the advanced material prepared by the guest leader. Students should be prepared to be active participants in the seminar discussions.

659 Internal Staffing: Managing Careers in Organizations Spring or summer. 3 credits. Limited to 30 students. Prerequisites: ILR 210/150 and 260/560 or equivalent and permission of instructor. B. Gerhart, S. Rynes. Analysis of the movements of people within organizations and the management of career development processes. Selected topics include job search and choice processes, career planning methods and techniques, career and life stages, mentorships, lifetime employment systems, midlife career changes, career and family integration, criteria for internal promotions, and the role of performance evaluation and assessment centers in placement decisions.

660 Seminar in Personnel or Human Resource Studies Fall or spring. 3 credits. Staff. A "floating" seminar designed to give faculty and students an opportunity to pursue specific topics in depth. The emphasis is on theory and research. Topics vary from semester to semester. Interested students should consult current course announcements for details.

661 Applied Personnel and Organizational Development Practice Spring. 3 credits. Prerequisite: undergraduates, ILR 260; graduate students, ILR 560 or equivalent. Staff. Deals with personnel development technique and organizational development intervention methodology. Students examine and practice group methodology, feedback and processing technique, active listening, one-to-one counseling, behavior modeling, role playing, the case method, team building, survey-guided interviewing, group development, and problem solving. This course involves hands-on participation in a workshop setting. Students have opportunities for developing and delivering scholarly papers that explore a specific method, technique, and/or critical issue. In addition, a final project requires a comprehensive proposal that describes an organizational development intervention.

662 Managing an Organization through Simulation Training Spring or summer. 3 credits. Limited to a total of 40 ILR and hotel administration students, seniors and graduate students only. Prerequisite: ILR 260 or 560 or equivalent, and permission of instructor. L. Wasmuth. Techniques of simulation are applied to a hotel banquet aspect of the simulation experience. Students examine selected issues and relevant research involved in the study of communication with formal organizations, organizational structure and design, patterns of information flow, and individual and group determinants of communication effectiveness will be important concerns.

664 Seminar in Organizational Communication Spring 3 credits. Permission of instructor: W. Frank. Seminar centers on selected issues and relevant research involved in the study of communication with formal organizations. Theories, methods and techniques, career and life stages, mentorships, lifetime employment systems, midlife career changes, career and family integration, criteria for internal promotions, and the role of performance evaluation and assessment centers in placement decisions.

665 Case Studies in Personnel Administration Spring. 3 credits. Enrollment limited. Prerequisite: ILR 260 or 560 plus two other courses in personnel and human resource studies and permission of instructor. Staff. An analysis of personnel management activities and their impact on organizational objectives and administration. Cases, incidents, and field data derived from a variety of institutional settings provide a framework for examining and explaining the various roles played by personnel managers. Students with a special interest in personnel are encouraged to use this course as a "capstone" to their studies.

666 Cost-Benefit Analysis Application to Human Resource Management Spring. 3 credits. Prerequisite: ILR 260 or 560 or equivalent, two courses in statistics, and permission of instructor. J. Boudreau. Increasingly, decisions about human resources are being made by considering those resources as important organizational assets (just as capital, raw materials, and energy are important assets). This perspective requires that human resource managers, labor leaders, consultants, and researchers understand how basic principles of decision making are applied to human resources and how tools from other disciplines (e.g., capital budgeting, inventory control, decision policy analysis) can be applied to provide information on human resource decisions. This seminar will introduce the concepts of costs and benefits, explore the relevant costs and benefits for human resource management decisions, introduce models from other disciplines that are relevant to human resource decisions, and provide an opportunity to develop and apply these decision-making techniques to actual human resource decision situations.

668 Staffing: Employee Selection and Utilization Fall or spring. 3 credits. Prerequisites: ILR 510/511 and 560 or equivalent; working knowledge of factor analysis, item analysis, content analysis, and ANOVA; and permission of instructor. J. Boudreau, B. Gerhart, S. Rynes. An analysis of the staffing process as applied to employing organizations. Topics examined include preselection and selection processes and techniques, career planning, employee separations, legal issues in selection, and the relationship between staffing and other organizational processes.

669 Administration of Compensation Fall or spring. 4 credits. Limited to 30 students. Prerequisite: ILR 260 or 560 or equivalent and permission of instructor. B. Gerhart, G. Milkovich, R. Risley, S. Rynes. Major emphasis is on the decisions and issues involved in the design and administration of compensation systems. Topics examined include the behavioral and economic theories and research related to compensation administration, and factors influencing decisions about pay levels, hierarchies, forms, and administration of pay. Also focuses on the effects of various pay systems on employee behavior and firm performance.

690 Personnel Information Systems Spring. 4 credits. Limited to 20 students. Prerequisite: ILR 260 or 560 or the equivalent; advanced electives in personnel; at least one course in statistics, and permission of instructor. L. Dyer. Explores the development, implementation, and management of computerized personnel information systems and their use in human resource management.
The workshop is designed to provide a forum for the educational and technological progress of productivity, and competitiveness of firms, individuals, and nations. We will investigate (1) how technological progress is changing the nature of work and what this implies for reform of education and training; (2) why United States productivity has not increased in the past fourteen years; (3) how education and training contribute to growth and competitiveness; (4) why educational achievement has declined, and (5) how the responsibility for education and training should be apportioned between individuals, firms, private nonprofit organizations, and government.

696 Personnel Administration and Government Regulations
Fall. 3 credits. Prerequisite: 1L&R 260 or equivalent. J. Risley. A survey and analysis of government regulations affecting personnel management in nongovernment organizations, examining the framework within which management must operate. Government agencies' methods of enforcement of such regulations and the firms' responsibilities for failure to comply with these legal requirements are considered. Emphasis will be on policy development and administration to meet legal requirements. Topics include EEO, OSHA, ERISA, Employee Rights, Employment at Will, EAP, and Title VII.

760 Seminar in Personnel or Human Resource Studies
Fall or spring. 3 credits. Prerequisites: 1L&R 560, 510/51/5, and 669 and permission of instructor. G. Milkovich. A "floating" seminar designed to give faculty and students an opportunity to pursue specific topics in detail, with an emphasis on theory and research. Topics vary from semester to semester. Interested students should consult current course announcements for details.

761 Human Resource Economics and Public Policy
Spring. 3 credits. V. Briggs. A review of contemporary labor-market trends and theories as they relate to public policy efforts to develop the employment potential of the nation's human resources. Changes in the "older" programs of apprenticeship, vocational rehabilitation, and vocational rehabilitation as well as the "new" programs are studied. Special policy issues pertaining to youth, rural workers, welfare reform, job creation, industrial policy, wage subsidies, and worker relocation will be examined. The role of research to policy formulation and methods of evaluation of social programs will be reviewed. Comparison will also be made with related European initiatives.

798 Internship
For description see the section on Collective Bargaining, Labor Law, and Labor History.

799 Directed Studies
For description see the section on Collective Bargaining, Labor Law, and Labor History.

960 Workshop in Personnel and Human Resource Studies
Fall or spring. 2 credits. Enrollment limited to M.S. and Ph.D. candidates. S/U grades only. Staff. The workshop is designed to provide a forum for the presentation and critical discussion of current research being undertaken by graduate students, faculty members, and invited guests in the field of personnel and human resource studies. All M.S. and Ph.D. candidates in the Department of Personnel and Human Resource Studies are urged to enroll; candidates in other departments are cordially invited to do so. Each participant will have an opportunity to benefit from the collective wisdom of the others in the formulation, design, and execution of his or her research, as well as to become current on the latest developments in the field.

Interdepartmental Courses

150 Survey of Industrial and Labor Relations
Fall. 3 credits. R. Aronson, V. Briggs, O. Mitchell. A survey for students in other divisions of the University. An analysis of the major problems in industrial and labor relations; labor union history, organization, and operation; labor-market analysis and employment practices; industrial and labor legislation and social security; personnel management and labor relations in industry; collective bargaining and the settlement of industrial disputes; and the rights and responsibilities of employers and employees.

151 Personnel Management for Managers
Fall or spring. 3 credits. Not open to ILR students. Staff. A study of the personnel function in work organizations, with special emphasis on the responsibilities of managers and supervisors. After reviewing evidence from behavioral science research on factors affecting work behavior, such major personnel areas as recruitment, selection, and placement; training; compensation and benefits, and discipline are considered.

451 Science, Technology, and the American Economy
Fall or spring. 4 credits. Common Learning Course. V. Briggs. Examines the influences of the growth of science and the spread of technology on the development of the American economy. Although attention will be given to evolutionary influences, the primary focus will be upon the post-WWII technology as a result of the introduction of automation, robotics, and computer technology. The vantage point will be the linkage of these developments with employment, unemployment, income, and productivity considerations. Public policy issues such as research and development policy, the role of national defense in the development of the biotechnology industry, the agricultural revolution, savings and investment rates, retaining and education needs, etc., will be explored. The related experiences of other industrial nations will also be discussed.

452 Writing in Industrial and Labor Relations
Spring. 3 credits. Limited to 20 students. J. Farley. This course will require close reading of four books in the field of industrial and labor relations and careful writing about them. Students will also have an opportunity to practice writing about the world of work for different audiences with an eye to publication.

ILR Extension

Metropolitan

The following courses are open only to participants in the Extension Division in New York City. These courses are not open to undergraduate or graduate students matriculated in the ILHa ILR programs. ILR Credit and Certificate Program courses at the Labor College are offered for four credits. Course and course credits earned in Extension Division certificate courses are not automatically accepted as transfer credits or as a basis of an manpower planning, recruiting, selection, wage and salary administration, training, performance appraisal, organizational development, and the administration of personnel department activities. Special attention is paid to government manpower policy and its implication for personnel management.

301 Labor Union Administration
Fall or spring. 3 credits. A review of the operations of American unions, including a general theoretical framework but with major emphasis on practical operating experience. The course will consider the formal government of unions; organizational or institutional purposes and objectives and how these are achieved; underlying structure and relationship among members, locals, and national organizations; the performance of the primary function of organizing; negotiating; contract administration; and the effect of the Landrum-Griffin Act.

326 Sociology of Occupations
Fall or spring. 3 credits. Focuses on (1) the changing character of American occupations within the context of social change; (2) occupational differences in income, prestige, and power; and the resultant general phenomenon of social stratification; (3) vertical and horizontal occupational mobility; (4) recruitment and socialization into occupational roles; (5) the process of professional development and administration to meet legal requirements. Topics include EEO, OSHA, ERISA, Employee Rights, Employment at Will, EAP, and Title VII.

346 Economics of Collective Bargaining
Fall or spring. 3 credits. Focuses on the negotiation of the context of social change; (2) occupational differences in income, prestige, and power; and the resultant general phenomenon of social stratification; (3) vertical and horizontal occupational mobility; (4) recruitment and socialization into occupational roles; (5) the process of professional development and administration to meet legal requirements. Topics include EEO, OSHA, ERISA, Employee Rights, Employment at Will, EAP, and Title VII.

350 History of Industrial Relations in the United States
Fall or spring. 3 credits. This course explores the history of industrial relations in the United States emphasizes developments in the twentieth century. The course focuses on the American worker, both union and nonunion; labor movements, and the environmental forces that have shaped industrial relations in the United States. Readings are selected from scholarly accounts and original sources.

351 Collective Bargaining
Fall or spring. 3 credits. A comprehensive study of collective bargaining; the negotiation and scope of contracts; the day-to-day administration of contracts; the major substantive issues in bargaining, including their implications for public policy; and the problem of dealing with industrial conflict.

352 Labor Relations Law and Legislation
Fall or spring. 3 credits. A survey of the law governing labor relations. The legal framework in which the collective bargaining relationship is established and bargaining takes place is analyzed. Problems of the administration and enforcement of collective agreements are considered, as are problems of protecting individual employee rights in the collective labor relations context. Also serves as an introduction to the legal system and method and to legal and constitutional problems of governmental regulation of industrial and labor relations.

353 Statistics (Statistical Reasoning)
Fall or spring. 3 credits. An introduction to the basic concepts of statistics: description of frequency distribution (averages, dispersion, and simple correlation) and introduction to statistical inference. Prerequisite to certain specialized courses in the application of statistics offered in various departments.

354 Economics of Wages and Employment
Fall or spring. 3 credits. Prerequisites: Economics 101-102 or equivalent.
An introduction to the characteristics of the labor market and to analysis of wage and employment problems. Among topics studied are the composition of the labor force, job-seeking and employment practices, methods of wage determination, theories of wages and employment, economic effects of unions, the nature and causes of unemployment, and programs to combat joblessness and poverty.

355 Society, Industry, and the Individual I Fall. 3 credits.
The relationship between industry and the economy as a whole and its implications for other social institutions in America (including stratification, politics, and American values) is discussed. The nature of industrial organizations and of complex organizations in general, emphasizing authority relations, goals, the division of labor, and bureaucracy.

356 Society, Industry, and the Individual II Spring. 3 credits.
Deals with the relationship between the individual and the organization and such basic psychological processes as need satisfaction, perception, attitude formation, and decision making. The individual is described and examined as a formal and informal group member. Within this area, particular emphasis is placed on leadership, problem solving, and conflict resolution.

420 Group Processes Fall or spring. 3 credits.
An advanced undergraduate and beginning graduate course emphasizing group development. Readings and discussion are concerned with interpersonal attraction, conformity, interaction process, leadership, group effectiveness, norms, etc. Laboratory experiences in group tasks are provided.

440 Health, Welfare, and Pension Plans Fall or spring. 3 credits.
An analysis and appraisal of private health, welfare, and pension plans. A consideration of the origin and development of employer, union, and joint programs and a critical examination of the financing, administration, and general effectiveness of the plans.

602 Arbitration Fall or spring. 3 credits.
A study of the place and function of arbitration in the field of labor-management relations, including an analysis of principles and practices, the law of arbitration, the handling of materials in briefs or oral presentation, the conduct of an arbitration hearing, and the preparation of an arbitration opinion.

681 Labor Relations Law Fall or spring. 3 credits.
An advanced undergraduate law covering such topics as emergency labor disputes, legal problems of labor relations in public employment, labor and the antitrust laws, civil rights legislation, rights of individual employees and union members, and legal problems of union administration.

683 An Analysis of the Union Steward's Role Fall or spring. 3 credits.
The course is an examination of the steward's role in connection with leadership, problem solving, and conflict resolution.

684 Employment Discrimination and the Law Fall or spring. 3 credits.
An examination of legal problems involving employment discrimination based upon race, color, religion, sex, national origin, or age. The impact of developing principles of law on preemployment inquiries and testing, seniority and promotions, and other personnel policies, practices, and procedures will be discussed. The prerequisites of affirmative action under Executive Order No. 11246, as amended, will be analyzed. Special attention will be given to the role of state law in resolving employment discrimination claims and the procedural framework for raising and adjudicating such claims before administrative agencies and the courts.

686 Collective Bargaining in the Public Sector Fall or spring. 3 credits.
An examination of the development, practice, and extent of collective bargaining between federal, state, and local governments and their employees. The course will emphasize public policy issues related to sovereignty, unit determination, representation procedures, and the strikes against government.

689 Labor Education Fall or spring. 3 credits. Prerequisite: permission of instructor.
An examination will be made of labor education, its origin, development, scope, form, functions, curricula, goals, issues, and roles in universities, unions, and other organizations. Attention will be devoted to various practical aspects associated with the administration of programs and to labor education as an occupation. The course will involve students in field activities in connection with current Extension Division programs.

Update
The following courses are open only to participants in the Extension Division's statewide credit programs in related areas. These courses are not open to undergraduate or graduate students matriculated in the Ithaca ILR programs.

242 Public Sector Collective Bargaining Fall or spring. 3 credits.
This course is designed as an introduction to collective bargaining in the public sector. The course examines the historical development of bargaining in public employment, the evolution of state and federal and bargaining theory and practices, as well as impasse resolutions techniques frequently found in this sector. Special emphasis will be given to developing an understanding of the similarities and differences between public and private sector bargaining and how this has affected tactics and strategies employed by the parties.

243 Growth of American Business and Management History Fall or spring. 3 credits.
The growth and cycles of American business enterprise produced significant changes in education, government, work, the family, the ethnic composition of the population, and the landscape. As business and industry expanded, new methods evolved for managing these enterprises. This course will examine the development of managerial practices, the relationship of management to the work force, and the social ramifications of capitalist expansion.

251 Principles and Practices of Management Fall or spring. 3 credits.
Examines the art and science of contract bargaining, including bargaining environments and structures as well as standards used in bargaining. Students will learn to prepare bargaining demands, cost economic items, draft noneconomic contract language, negotiate economic and noneconomic issues, and resolve a contract bargaining impasse. The course will consider the impact of contract bargaining outcomes on workers, unions, employers, and the public.

252 Contract Bargaining Fall or spring. 3 credits.
Examines the art and science of contract bargaining, including bargaining environments and structures as well as standards used in bargaining. Students will learn to prepare bargaining demands, cost economic items, draft noneconomic contract language, negotiate economic and noneconomic issues, and resolve a contract bargaining impasse. The course will consider the impact of contract bargaining outcomes on workers, unions, employers, and the public.

253 Contract Administration Fall or spring. 3 credits.
Focuses on the role of the steward in administering the union contract in the workplace. Students will evaluate grievance and arbitration contract clauses, the grievance and arbitration procedures, the responsibilities of the union steward, the role of local and international unions, negotiation of grievances, and preparation for arbitration.

254 Labor Law Fall or spring. 3 credits.
Examines the principles of labor law by looking at social philosophy and the historical context of federal labor legislation from the 1930s. Students will concentrate on major provisions of the National Labor Relations Act, examining how the National Labor Relations Board and the federal courts have interpreted the national labor laws. Discussion will include new directions in labor legislation and interpretation with consideration given to the impact of labor law on workers, unions, and employers.

255 Labor History Fall or spring. 3 credits.
Reviews American labor history from the perspective of social and economic issues of the development of its working class, reform and revolutionary movements, and the emergence of craft, industrial, and public employee unions. Included will be a discussion of the development of trade union institutions and the leaders and the evolution of union political activities and collective bargaining. Special attention will be paid to the involvement of women and minority workers with unions.

256 Dispute Resolution Fall or spring. 3 credits.
Examines third-party participation in dispute resolution in private and public sector collective bargaining. Development of dispute resolution methods in American labor relations; issues and practices in neutral, binding arbitration of grievances and mediation; conciliation; and fact-finding procedures will be discussed. We will also look at exclusive labor-management mechanisms to settle industry disputes.

257 Personnel Administration Fall or spring. 3 credits.
Designed to provide an overview of personnel practices in the modern organization. It will focus on manpower planning, employment, training and development, motivation and compensation, and performance appraisal and communication for students who are currently supervisors or personnel practitioners or those aspiring to those positions.

258 Organizational Behavior Fall or spring. 3 credits.
Designed to illustrate how behavioral science theory leads to research and how theory and research provide a basis for practical application in business, industry, education, and government.

259 Union Administration Fall or spring. 3 credits.
Focus is on the principles and practices of effective union administration. Students will study the dynamics of democratic organizations and the development of organizational leadership. The course also examines alternative methods of decision making and lines of responsibility. The legal obligations of unions and union officials will be discussed and analyzed. The course also examines the structure and evolution of the labor movement.

261 Introduction to Audio-Visual Production for Trade Unionists Fall or spring. 2 credits.
Acquaints students with the powerful role that radio and other media play in carrying labor's message to the public. Students will learn basic writing, interviewing, and technical skills necessary for the production of radio programs. All students will be expected to participate in a class audio project.
357 Labor Education  Fall or spring. 3 credits. An examination will be made of labor education and its origin, development, scope, form, functions, curricula, goals, issues, and roles in universities, unions, and other organizations. Attention will be devoted to various practical aspects associated with the administration of programs and to labor education as an occupation. The course will involve students in field activities in connection with current Extension Division programs.

358 Labor Education II  Fall or spring. 3 credits. The course will be divided into two parts. Part I is planned to develop an understanding of the theories of program organization and administration, including budgeting, which is necessary if labor education is to be transferred to the local union level. Part II joins theory and practice in the effort to (1) provide rank and file union leaders with the opportunity to develop and use research skills, (2) gain subject matter expertise, (3) formulate course outlines from which to teach, and (4) select appropriate teaching methods and prepare materials for classroom use. Practice teaching is a necessary component of such an advanced course. Again, providing experiences that combine theory and practice.

359 Directed Studies in Labor Education  Fall or spring. 3 credits. Designed to grant credit for fieldwork under the direction of members of the faculty. Third semester of an intensive training program in labor education for mature students with demonstrated ability to undertake independent work who have been carefully screened and selected for participation in this course. Combines 160 hours of fieldwork in a union or education related program with 3-hour seminars in the classroom. Classroom meetings are devoted to (1) in-depth analysis of union experiences in relation to labor education, theory, method and techniques, and (2) individual consultations.

360 Labor Education III  2 credits. This is a course designed to give labor educators advanced teaching techniques and specific methodology for expanding their training. Instruction will be combined with practical teaching experience in three, three-hour laboratories. Students will learn to polish their presentation style by studying voice projection, rhetorical techniques, timing and pacing of class units, controlling individual disruptors to the progress of the class, and, finally, summarizing the work accomplished.

Faculty Roster

Bacharach, Samuel. Ph.D., U. of Wisconsin. Prof., Organizational Behavior
Barney, Stephen R., Ph.D., Mass. Inst. of Technology. Asst. Prof., Organizational Behavior
Blumen, Isadore, Ph.D., U. of North Carolina. Prof., Economic and Social Statistics
Boudreau, John W., Ph.D., Purdue U. Asst. Prof., Personnel and Human Resource Studies
Boyer, George R., Ph.D., U. of Wisconsin. Asst. Prof., Labor Economics
Briggs, Vernon M., Jr., Ph.D., Michigan State U. Prof., Personnel and Human Resource Studies
Brooks, George W. M.A., Brown U. Prof., Emeritus
Cullen, Donald E., Ph.D., Cornell U. Prof., Collective Bargaining, Labor Law, and Labor History

Dyer, Lee D., Ph.D., U. of Wisconsin. Prof., Personnel and Human Resource Studies
Ehrenberg, Ronald, Ph.D., Northwestern U. Prof., Labor Economics
Eppley, Jennie T., Ph.D., Cornell U. Assoc. Prof., Extension
Fields, Gary S., Ph.D., U. of Michigan. Prof., Labor Economics
Frank, William W. Ph.D., Michigan State U. Prof., Extension/Personnel and Human Resource Studies
Gray, Lois S., Ph.D., Columbia U. Prof., Extension
Gross, James A., Ph.D., U. of Wisconsin. Prof.
Kearan, Roger R., Ph.D., U. of Wisconsin. Assoc. Prof., Extension
Korman, A. Gerd, Ph.D., U. of Wisconsin. Prof., Collective Bargaining, Labor Law, and Labor History
Milkovich, George, Ph.D., U. of Minnesota. Prof., Personnel and Human Resource Studies
Miller, Frank B., Ph.D., Cornell U. Prof., Emeritus
Mitchell, Olivia S., Ph.D., U. of Wisconsin. Assoc. Prof., Labor Economics
Oleson, William R., Ph.D., U. of Washington. Assoc. Prof., Organizational Behavior
Saltare, Nicholas, Ph.D., U. of California at Berkeley. Assoc. Prof., Collective Bargaining, Labor Law, and Labor History
Seebrook, Ronald L., Ph.D., U. of Illinois. Asst. Prof., Extension
Smith, Robert S., Ph.D., Stanford U. Prof., Labor Economics
Stern, Robert N., Ph.D., Vanderbilt U. Assoc. Prof., Personnel and Human Resource Studies
Tolbert, Pamela S., Ph.D., U. of California. Asst. Prof., Organizational Behavior
Trans, Cliff, U. of Wisconsin. Prof., Organizational Behavior
Ullman, Paul F., Ph.D., Princeton U. Assoc. Prof., Economic and Social Statistics
Wasmuth, William J., Ph.D., Indiana U. Prof., Extension/Personnel and Human Resource Studies
Williams, Lawrence K., Ph.D., U. of Michigan. Prof., Organizational Behavior

Windmiller, John P., Ph.D., Cornell U. Prof., Collective Bargaining, Labor Law, and Labor History/International and Comparative Labor Relations
Law School

Administration

Peter W. Martin, dean of the law faculty and professor of law
Jane L. Hammond, law librarian and professor of law
Charles W. Wolfram, associate dean for academic affairs and Charles Frank Reavis Sr. Professor of Law
Anne Lukingbeal, associate dean for student affairs
Albert C. Nienstedt, associate dean and director of alumni affairs and placement
Frances M. Bullis, assistant dean for development and public affairs
Richard D. Geiger, assistant dean for admissions

Law School

The primary function of the Law School is to prepare attorneys for both public and private practice who are equipped to render skillful professional service and who are thoroughly conscious of the important role played by the law as a means of social control. The curriculum is designed to prepare students for admission to the bar in the American states and territories.

Ordinarily, a student who is admitted to the Law School must have a baccalaureate degree from an approved college or university. The course of study leading to the degree of Doctor of Law (J.D.) covers three academic years. A number of students will be admitted to a program of study leading to the degree of Doctor of Law "with specialization in international legal affairs."

There are combined graduate degree programs with the Johnson Graduate School of Management, the College of Arts and Sciences, the Department of City and Regional Planning, the School of Industrial and Labor Relations, and the graduate divisions in economics, history, and philosophy, as well as a special opportunity for highly qualified undergraduates in the College of Arts and Sciences to register in the Law School during their senior year.

The graduate program of the Cornell Law School is a small one, to which only a few students are admitted each year. The LL.M. degree (Master of Laws, Legum Magna) and the J.S.D. degree (Doctor of the Science of Law, Jurisprudentiae Scientiae Doctor) are conferred.

A small number of law graduates may also be admitted without being degree candidates.

For further information, refer to the Announcement of the Law School, obtainable from the director of admissions, Myron Taylor Hall.

First-Year Courses

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<td>Civil Procedure</td>
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Upperclass Courses

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Faculty Roster

Alexander, Gregory S., J.D., Northwestern U. Prof.
Amar, Alfred C., Jr., J.D., U. of Chicago. Prof.
Barcelo, John I., J.S.D., Harvard U. A. Robert Noll Professor of Law
Belcourt, Kevin M., J.D., Harvard U. Prof.
Cramton, Roger C., J.D., U. of Chicago. Robert S. Stevens Professor of Law
Eisenberg, Theodore, J.D., U. of Pennsylvania. Prof.
Farina, Cynthia E., Boston U. Asst. Prof.
Gunn, Alan, J.D., Cornell U. J. du Pratt White Professor of Law
Hammond, Jane L., J.D., Villanova U. Prof.
Hay, George A., Ph.D., Northwestern U. Prof., Law/Economics
Henderson, James A., Jr., LL.M., Harvard U. Frank B. Ingersoll Professor of Law
Hillman, Robert A., J.D., Cornell U. Prof.
Hillman, Robert A., J.D., Cornell U. Prof.
Johnson, Sheri L., J.D., Yale U. Assoc. Prof.
Kendall, Robert B., J.D., Boston Coll. Edwin H. Osgood Professor of Law
Kent, Robert E., J.S.D., Boston U. Prof.
Lyons, David B., Ph.D., Harvard U. Prof., Law/Philosophy
Macey, Jonathan R., J.D., Yale U. Prof.
Martin, Peter W., LL.B., Harvard U. Prof.
Osago, Russell K., J.D., Yale U. Prof.
Palmer, Larry I., LL.B., Yale U. Prof.
Roberts, Ernest F., LL.B., Boston Coll. Edwin H. Woodruff Professor of Law
Rossi, Faust F., J.D., Cornell U. Samuel S. Leibowitz Professor of Trial Techniques
Shiffrin, Steven H., J.D., Loyola U. of Los Angeles, Prof.
Siliciano, John A., J.D., Columbia U. Asst. Prof.
Simson, Gary J., J.D., Yale U. Prof.
Summers, Robert S., LL.B., Harvard U. William G.
  McRoberts Research Professor in Administration of
  the Law
Williams, David C., J.D., Harvard U. Asst. Prof.
Williams, Susan H., J.D., Harvard U. Asst. Prof.
Wolfram, Charles W., LL.B., U. of Texas. Charles Frank
  Reavis Sr. Professor of Law
Zacharias, Fred C., LL.M., Georgetown U. Law Center.
  Asst. Prof.
Johnson Graduate School of Management

Administration

Curtis W. Tarr, dean
Thomas R. Dyckman, associate dean for academic affairs
Dick R. Wittink, director, doctoral program
James W. Schmitter, associate dean for administration
Ann L. Calkins, assistant dean for external relations
Maria Blackburn, director of admissions
Paul Brenner, director of corporate relations
Nancy A. Culligan, business manager and director of personnel
Laurie Foltman, director of career services
Linda Myers, managing editor, Cornell Enterprise, and publications coordinator
Rhea J. Nickerson, assistant to the dean
Betsy Ann Olive, librarian
Donald Schnedeker, librarian for business information services
Harriet Peters, director of advising and registrar
Linda Pike, managing editor, Administrative Science Quarterly
C. Clinton Sidle, director of finance and business operations and executive director of continuing education
Susan Stone, director of financial aid
L. Joseph Thomas, director of the Executive Development Program
Eugene Ziegler, director of computing services

The Johnson Graduate School of Management prepares men and women for managerial careers in business. The school offers course work in many disciplines to provide potential managers with an understanding of the complexities of the professional world in which they will operate and of the organizations of which they will become a part.

A bachelor's degree or its equivalent is required for admission to the two-year program leading to the Master of Business Administration (M.B.A.) degree. Nearly half of the students have a background of undergraduate studies in arts and sciences, and about one-quarter in engineering. One-quarter of the students begin their graduate training immediately after receiving their bachelor’s degrees and the remaining three-quarters following work experience.

Combined degree programs allow highly qualified Cornell students to register in the school during their senior year, thereby earning a master's degree in less than the usual time.

The doctoral program, administered through the Graduate School, provides an advanced level of education in business for those who seek careers in teaching and research at leading universities.

More detailed information about these programs is available in the Cornell University Announcement, Johnson Graduate School of Management, obtainable from the Office of Admissions and Student Affairs, Johnson Graduate School of Management, Malott Hall.

Undergraduate Only

NBA 300 Entrepreneurship and Enterprise
Prerequisite: Introductory Accounting or equivalent, or permission of instructor.

This course provides a disciplined look at the entrepreneur and small business management. It deals with the formation and the acquisition of enterprises from the viewpoint of individuals who desire to become the principal owners. Reviews include legal and tax aspects, valuation techniques, organization forms, and venture-capital sources, as well as planning techniques necessary to launch a successful venture.

NCC Common Core Courses

NCC 500 Financial Accounting
NCC 501 Quantitative Methods for Management
NCC 502 Microeconomics for Management
NCC 503 Marketing Management
NCC 504 Behavioral Science
NCC 505 Macroeconomics and International Trade
NCC 506 Managerial Finance
NCC 507 Management Information Systems
NCC 508 Production and Operations Management
NCC 510 Business-Government Interface
NCC 511 Business Strategy and Policy

NBA Management Elective Courses

Accounting
NBA 500 Intermediate Accounting
NBA 501 Advanced Accounting
NBA 502 Managerial Cost Accounting
NBA 504 Taxation Affecting Business and Personal Decision Making
NBA 505 Auditing Not offered 1987–88
NBA 506 Financial Information and Evaluation
NBA 507 Federal Income Tax
NBA 508 Accounting for Mergers and Consolidations

Behavioral Science
NBA 660 Strategy Implementation: Process and Politics
NBA 661 Organizational Theory
NBA 662 Power and Interpersonal Influence
NBA 663 Behavioral Decision Theory
NBA 664 Decision Aiding Not offered 1987–88
NBA 665 Management of Innovation and Technological Change
NBA 666 Negotiations
NBA 667 Managing Groups
NBA 668 Organizational Politics
NBA 669 Organizational Design

Economics
NBA 520 Pricing and Strategy
NBA 521 Regulation, Deregulation, and Antitrust: Government Regulation of Business
NBA 522 Managerial Economics
NBA 523 Business and Economic Forecasting
NBA 524 Competitive Industry Analysis Not offered 1987–88
NBA 525 The Economics of Pay and Performance

Finance
NBA 540 Financial Policy Decisions
NBA 541 Economic Evaluation of Capital Investment Projects
NBA 542 Investment Management and Security Analysis
NBA 543 Financial Markets and Institutions
NBA 544 Bank Management
NBA 545 Finance Theory Not offered 1987–88
NBA 546 Options, Bonds, and Commodities
NBA 547 Investment Banking Not offered 1987–88
NBA 548 Trading
NBA 549 Strategic Decision Making
NBA 550 Financial Instruments and Contracts

General Management
NBA 560 Business Law
NBA 561 Advanced Business Law Not offered 1987–88
NBA 562 An Introduction to Estate Planning Not offered 1987–88
NBA 563 Strategic Business Policy Issues Not offered 1987–88
NBA 564 Entrepreneurship and Enterprise
NBA 565 Law of Business Associations Not offered 1987–88

NBA 567 Management Writing
NBA 568 Oral Communication
NBA 571 Business and American Society
NBA 572 Law of Mergers and Acquisitions
NBA 573 The Professional Manager at Work
NBA 574 Health-Services Organization and Financing
NBA 575 Health and Welfare Policy Analysis
NBA 576 Alternative Health and Social Service Delivery Systems
NBA 577 The External Environment of Business
Faculty Roster

Abolafia, Mitchell, Ph.D., SUNY at Stony Brook. Asst. Prof., Organizational Behavior
Anderson, Philip, Ph.D., Columbia U. Asst. Prof., Organizational Behavior
Battistella, Roger M., Ph.D., U. of Michigan. Prof., Health Policy and Management
Bell, Nancy, Ph.D., U. of California at Berkeley. Asst. Prof., Organizational Behavior
BenDaniel, David, Ph.D., Massachusetts Inst. of Technology. Don and Margi Berens Professor of Entrepreneurship
Berman, Harold, Jr., Ph.D., U. of Michigan. Nicholas H. Noyes Professor of Business Administration, Business Administration/Finance
Bugiari, Joseph B., J.D., Cornell U. Prof., Agricultural and Business Law
Chan, Louis, Ph.D., Rochester U. Asst. Prof., Finance
Conway, Richard W., Ph.D., Cornell U. Prof., Information Systems
DeGrafa, Patrick, Ph.D., U. of Pennsylvania. Asst. Prof., Economics
Dyckman, Thomas R., Ph.D., U. of Michigan. Ann Whitney Olin Professor of Accounting, Accounting
Elliott, John A., Ph.D., Cornell U. Assoc. Prof., Accounting
Freeman, John, Ph.D., North Carolina at Chapel Hill. Prof., Organizational Behavior
Green, Jerome E., Ph.D., Carnegie-Mellon U. Prof., Managerial Economics and Finance
Hilton, Ronald W., Ph.D., Ohio State U. Prof., Accounting
Jarow, Robert A., Ph.D., Massachusetts Inst. of Technology. Assoc. Prof., Economics and Finance
Krackhardt, David, Ph.D., U. of California at Irvine. Asst. Prof., Organizational Behavior
Lind, Robert C., Ph.D., Stanford U. Prof., Economics, Management, and Public Policy
McAdams, Alan K., Ph.D., Stanford U. Assoc. Prof., Managerial Economics
McClain, John O., Ph.D., Yale U. Prof., Quantitative Analysis
Mitchell, Deborah, U. of Chicago. Asst. Prof., Marketing
Morse, Dale, Ph.D., Stanford U. Assoc. Prof., Accounting
O'Hara, Maureen, Ph.D., Northwestern U. Assoc. Prof., Finance
Olsen, Maureen, Ph.D., Northwestern U. Assoc. Prof., Finance
Oldfield, George S., Ph.D., U. of Pennsylvania. Prof., Economics and Finance
Orman, Levent, Ph.D., Northwestern U. Assoc. Prof., Information Systems
Rao, Vithala R., Ph.D., U. of Pennsylvania. Prof., Marketing/Quantitative Methods
Robinson, Lawrence W., Ph.D., U. of Chicago. Asst. Prof., Operations Management
Rosen, Charlotte, Ph.D., Cornell U. Lec., Management Communication
Rosen, Charlotte, Ph.D., Cornell U. Sr. Lec., Coordinator, Management Communication

Adjunct, Visiting, and Part-Time Faculty

Abowd, John, Ph.D., U. of Chicago. Visiting Assoc. Prof., Industrial and Labor Relations
Grant, Julia E.S., M.S. (Ph.D. expected 1988), Cornell U. Lec., Accounting
Katz, Jan, Ph.D., Massachusetts Inst. of Technology. Visiting Asst. Prof., Industrial and Business Accounting
Pempel, T. J., Ph.D., Columbia U. Prof., Government
Schmitter, James W., Ph.D., Northwestern U. Lec., Business History
Division of Nutritional Sciences

Administration
Maiden C. Nesheim, director
Marjorie M. Devine, associate director for academic affairs
Betty Lewis, graduate faculty representative, Field of Nutrition
David Levitsky, division honors chairperson

The Division
Nutritional science deals with the intricate relationship of food, nutrition, and health. At Cornell, the focal point for this broad field of study, which ranges from nutrient chemistry to world hunger, is the Division of Nutritional Sciences.

The division is affiliated with both the College of Human Ecology and the College of Agriculture and Life Sciences and brings together specialists from many disciplines in the biological and social sciences. Their work covers undergraduate and graduate teaching, nutrition research, and public education, including cooperative extension services.

The faculty in the division are working toward two closely related goals: increasing our knowledge of nutrition and health, and applying what we know to people’s everyday problems. This approach carries over to undergraduate education. Students who major in nutritional sciences learn how to interpret basic research from the laboratory and from the social sciences. They also come to understand the practical implications of their studies. Many students have the chance to test out their ideas by conducting a research project or working in the community.

Facilities
Most of the faculty members of the division work in Savage Hall and Martha Van Rensselaer Hall. In addition to housing offices, classrooms, and seminar rooms, those buildings contain animal-care and research facilities, specialized laboratories, a human metabolic research unit, and interactive terminals for the university’s computer system.

Savage Hall also has a graduate reading room, and in Martha Van Rensselaer Hall the division has set up the Learning Resources Center, which many undergraduates use for individual study and small group discussions. The Learning Resources Center contains class materials, audiovisual aids, and supplementary books and periodicals for independent study and special projects in nutrition.

The Major
The B.S. degree program with a major in nutritional sciences (NS) offers five major options, but all of them give students a thorough foundation in the basic sciences, the field of nutrition, and communication skills. Graduates are qualified for a variety of entry-level positions in laboratory research, consumer affairs, nutrition education, and clinical and public-health services. All students are well prepared to pursue dietician training or advanced study in fields such as nutrition, food science, biomedical sciences, and public policy.

Most undergraduates who major in nutritional sciences enroll in the College of Human Ecology. Students in the College of Agriculture and Life Sciences can also pursue a nutritional sciences option through the General Studies Program, and students in the College of Arts and Sciences can take a nutrition concentration as an independent option in the Division of Biological Sciences. Nutrition courses can be used to meet graduation requirements in all three colleges.

Academic Advising
Every student majoring in nutritional sciences is assigned a faculty adviser from the division. An effort is made to match interests, and students may change advisers at any time if their goals and interests change. Regular student-adviser conferences are required at least twice a year. The adviser not only helps students select courses but can often suggest opportunities for individual study or experience outside the classroom.

The specific course requirements for graduation and for each major option are listed in the Human Ecology Student Guide, available on request. Questions about undergraduate study should be addressed to Marjorie Devine, associate director for academic affairs, 334 Martha Van Rensselaer Hall.

The Core Curriculum
In their freshman and sophomore years, all undergraduates majoring in nutritional sciences follow a core curriculum that builds the foundation for any aspect of advanced study in nutrition. The core curriculum includes courses in food and nutrition, laboratory skills, humanities and communications, introductory social sciences, and basic sciences. There is some choice of science courses, but all nutrition students need a good background in general and organic chemistry, biochemistry, microbiology, physiology, and mathematics.

Transfer students need to pay particular attention to the core curriculum and may need to take an extra semester to fulfill all of the basic requirements, especially in the sciences. The course NS 300, Special Studies for Undergraduates, which allows students to take "pieces" of courses, helps transfer students integrate the previous training into the requirements for the nutritional sciences major without duplicating course work.

By their junior year, students start taking the more specialized courses required for the nutritional sciences option they choose: experimental and consumer food studies, nutrition, nutritional biochemistry, clinical nutrition, or community nutrition. The core curriculum ensures that they can move into any option or change options.

Options

Option I: Experimental and Consumer Food Studies
Students electing this option concentrate on basic and applied science courses, including physiological aspects of food, experimental food methods, and nutrition. From this option, students are prepared to pursue graduate study in food and/or nutritional sciences. With their knowledge of how the composition and treatment of food affect food quality, safety, acceptability, and nutritive value, graduates find jobs in dietetics, food service, development and evaluation of food products, food legislation, consumer service, and public policy. To support those career options, additional course work is recommended in areas such as dietetics, food service administration, communications, economics, government, public policy, marketing, and management.

Option II: Nutrition
This option is designed for students who have interests in the scientific bases of the nutritional and food sciences. The program of lectures and laboratories in biochemistry, physiology, and microbiology provides a basis for graduate study in either human nutrition or food sciences. The option also offers opportunities to plan a varied concentration of courses to meet specific career goals.

Option III: Nutritional Biochemistry
This option builds on the basic science core to give a solid foundation in the biological aspects of human nutrition in health and disease. Designed for students interested in pursuing an advanced study in human nutrition or medicine, the program stresses courses and laboratory work in the natural and biological sciences, with an emphasis on application to human problems.

Option IV: Clinical Nutrition
This option gives students the skills to help people translate nutritional knowledge into action. It provides a strong background in basic and nutritional sciences but also includes supporting courses in the social sciences and communications. Students are prepared to pursue graduate student in community nutrition, public health nutrition, and related fields. Practical experience through supervised field study is strongly recommended and is an asset to finding entry-level positions in community nutrition, including nutrition education.

Career Planning
Major requirements represent the minimum course work for each option. With an adviser’s help, students can add courses and special experiences that will meet their career interests.

There is some choice among the basic sciences regardless of the options selected. All students who have adequate preparation in high school mathematics and chemistry are encouraged to take Chemistry 207-208.

Students considering advanced study at a graduate or medical school should select science alternatives that prepare them for admission. Many graduate schools require a year of college mathematics, biology, organic chemistry, and in some cases, physics, for entrance.

Students interested in dietetics in applied nutrition should consider planning their course work to meet the requirements for membership and registration in the American Dietetic Association (ADA). Advisors in the division will help students plan their course work to meet the ADA’s academic requirements and will counsel them on applying for internships. Additional information on the dietetics program at Cornell can be obtained from Rose Marie Holmes, 314 Martha Van Rensselaer Hall, and Joan M. L. Koch, 373 Martha Van Rensselaer Hall.
Field Study Program

Structured field experience in a community agency or health-care facility can be taken for credit in several ways: through an independent study course, as a class project, or as a summer study project. Interested students should consult Nancy Peckensen, the division's field-study coordinator.

Independent Study Electives

Independent study courses (NS 400, 401, 402) can be used to obtain credit for more diverse or intensive experience than the classroom can offer, whether this involves laboratory work, library research, or field study. Any student interested in independent study should obtain the sponsorship of a faculty adviser and the approval of Dr. Devine or consider applying to the honors program.

Honors Program

The honors program, leading to a B.S. degree with honors in nutritional sciences, gives official recognition to students who have demonstrated excellence in their academic work and their capacity for independent study. In addition to fulfilling the requirements for a major option in nutritional sciences, students in the honors program take courses on designing and evaluating research, complete an original piece of research, and prepare an honors thesis. The honors project may be laboratory or field research or deal with policy and program development.

For more information, students should contact David LeVitsky, honors chairperson, 114 Savage Hall.

Exercise Science Concentration

Students interested in physical fitness and nutrition may pursue a concentration in exercise science through a special program with the School of Health, Physical Education, and Recreation at Ithaca College. This program includes elective courses in fitness measurements, exercise physiology, and the biomechanics of human movement. For further information, contact M. M. Devine, associate director for academic affairs, 334 Martha Van Rensselaer Hall.

Courses Recommended for Nonmajors

Courses in nutritional sciences can strengthen programs of study in biological science, medicine, agriculture, food science, human services, and other fields.

Introductory courses in nutrition (NS 115) and food (NS 146) are open to all students, as are some special-interest courses (NS 222, Maternal and Child Nutrition; NS 325, Sociocultural Aspects of Food and Nutrition; and NS 457, National and International Food Economics).

Nonmajors who have taken college courses in chemistry, biological sciences, and nutritional sciences may elect advanced food and nutrition courses with the permission of the instructor.

Graduate Programs

Graduate study is administered by the Field of Nutrition, a group of more than forty faculty members from throughout the university who have a common interest in nutritional problems. In the M.S. and Ph.D. degree programs, students may major in animal nutrition, human nutrition, international nutrition, nutritional biochemistry, foods, or general nutrition. A professional Master of Nutritional Science (M.N.S.) degree in clinical nutrition combines academic study and research on campus with clinical training at affiliated institutions in upstate New York and New York City. Field experience is also a component of concentrations in community nutrition, public-health nutrition, and nutrition education.

The specialties and interests represented by faculty in the Field of Nutrition provide almost unlimited opportunity for graduate study. Cornell's extensive laboratory and agricultural facilities ensure that students interested in experimental nutrition have exceptional choice and thorough training. As the largest faculty in the country devoted to the study of human nutrition, the field includes specialists in biochemical, metabolic, epidemiological, and sociocultural research. Opportunities to work with local, community and federal agencies are available to students interested in applied nutrition and public policy, and students in international nutrition are expected to conduct their thesis research abroad.

For more information about the graduate program, interested persons may write for the brochure Graduate Study in Nutrition, available from the Graduate Faculty Representative, Field of Nutrition, Cornell University, Savage Hall, Ithaca, New York 14853-6301.

Courses

115 Ecology of Human Nutrition and Food
Fall or spring. 3 credits. Prerequisites: fall, high school biology (juniors and seniors with advanced biological science background should check with the instructor); spring, a one-semester college biology course. S-U grades optional.
Fall: M W F 1-2:25; evening prelims, 3 credits. Four hours of lecture scheduled in place of some lecs. Evening prelims, times to be announced by M. Devine. An introduction to the field of human nutrition and food. Includes study of human nutritional needs; problems encountered in providing food to meet nutritional needs; relationships of nutritional and psychological needs, sociocultural systems, food, and the significance of those relationships to health promotion and disease prevention. Discussion of current issues such as weight control, vegetarianism, athletes' diets, heart disease, and cancer prevention.

146 Introductory Foods
Fall and spring. 3 credits. Each section limited to 18 students. Prerequisite: NS 115 or concurrent registration. Permission of instructor during course registration required (permission-of-instructor forms must be obtained from and returned to 325 Martha Van Rensselaer Hall). Lec. M 12:20; lab, T R 10:10–12:05 or 2:30–4:25. Evening prelims, times to be arranged. M. Pimentel. Criteria for evaluating the practice of the science of food and nutrition. Laboratory includes an introduction to the physicochemical properties of food and the relationship of those properties to preparation techniques and palatability characteristics of food. Meal preparation focusing on human nutritional needs and the management of money and time, is included.

222 Maternal and Child Nutrition
Spring. 3 credits. Prerequisite: NS 115 and a college biology course. S-U grades optional.
M W F 11:15. Evening prelims, times to be announced.
Involves the study of nutritional requirements in pregnancy, lactation, infancy, and childhood growth through adolescence. Topics include the relationship between maternal diet and pregnancy outcome; analysis of different methods of infant feeding; and nutritional status of pregnant women, children, and adolescents in the United States and in developing countries.

246 Introduction to Physicochemical Aspects of Food
Fall or spring. 4 credits. Each section limited to 18 students. Prerequisites: a college course in organic chemistry or biochemistry, NS 146, and permission of instructor during course registration (permission-of-instructor forms must be obtained from and returned to 325 Martha Van Rensselaer Hall). S-U grades optional. Lecs, T R 9:05; labs: fall M W 2–4:25 or T R 10:10–12:25, spring M W 2–4:25 or T R 2–4:25. Fall, B. Lewis; spring, R. Parker. The course offers a cross-cultural perspective for understanding the environmental and sociocultural parameters affecting the development of food consumption patterns. Emphasis is on theories on formation of food habits, dietary methodologies, ethnicity and food habits, and educational programs in nutrition, in national and international contexts.

331 Physiological and Biochemical Bases of Human Nutrition
Spring. 3 credits. Prerequisites: Biological Sciences 330 or 331 and NS 115 or equivalent. S-U grades optional.
M W F 10. M. H. Dagenais; spring, R. M. Cotner. The biochemical and physiological bases for human nutritional requirements, including digestion and absorption, energy metabolism, food intake regulation, protein amino acids, minerals, vitamins, and determination of nutritional status.

332 Laboratory Methods in Nutritional Sciences
Fall or spring. 3 credits. Each section limited to 18 students. Prerequisites: NS 331 or concurrent registration and permission of instructor during course registration.
498 Honors in Nutritional Sciences Spring. 1 credit. Limited to students admitted to the division honors program. Students may register in NS 499 concurrently.
T 2-30-4. D. Levitsky, coordinator. Informal presentation and discussion of current topics, in food and nutrition in which all members participate. Written reports on topics discussed may be requested. Delination of honors research problems in consultation with faculty adviser.

499 Honors Problem Fall and spring. Credits to be arranged. Open only to students in the division honors program.
Disc, T 11-15, plus additional hours to be arranged. Division faculty. D. Levitsky, coordinator. An independent study, literature, laboratory, or field investigation. Students should plan to spread the work over two semesters.

600 Special Problems for Graduate Students Fall or spring. Credit to be arranged. Limited to graduate students recommended by their chairperson and approved by the instructor in charge. S-U grades optional.
Hours to be arranged. Division faculty. Emphasis on independent advanced work. Experience in research laboratories in the division may be arranged.

601-604 Advanced Nutrition Series A series of nutrition courses offered jointly by the Division of Nutritional Sciences and the Departments of Animal Science and Poultry Science. Prerequisites: courses in nutrition, physiology, and biochemistry, including intermediary metabolism, or permission of instructor.

601 Proteins and Amino Acid in Nutrition (also Animal Science 601) Spring. 2 credits. Prerequisites: physiology, biochemistry, and nutrition, or permission of instructors. Offered alternate years. Not offered 1988–89.
W 11:15. R. E. Austin, M. Morrison. A course in amino acid and protein nutrition with emphasis on the dynamic aspects of protein digestion and amino acid absorption, protein and amino acid metabolism, nutrient interrelationships, assessment of protein quality, and amino acid availability and amino acid requirements in humans, other monogastrics, and ruminants.

602 Lipids Fall. 2 credits.
TR 11-15. A. Bensadoun. Advanced course on biochemical, metabolic, and nutritional aspects of lipids. Emphasis is on critical analysis of current topics of lipid methodology, lipid absorption, lipoprotein secretion, structure, and catalysis; mechanisms of hormonal regulation of lipolysis and fatty acid synthesis; and cholesterol metabolism and atherosclerosis.

604 The Vitamins Fall. 2 credits. TR 10-10: G. F. Combs, Jr. Lectures on nutritional aspects of the vitamins, including recent developments in nutritional and biochemical interrelationships with other nutrients and metabolites.

607 Nitrogen Metabolism (also Biological Sciences 650) Spring. 2 credits. Prerequisites: Chemistry 358 or 360 and Biological Sciences 330 or 331, or permission of instructor. Offered alternate years. alternatives with NS/BS 635, Metabolic Regulation. Next offered 1988–89.
T 9:05. M. Watford. The course will cover most aspects of nitrogen metabolism. The first section will consider nitrogen fixation, assimilation in bacteria and the metabolism and biological importance of purines, pyrimidines, porphyrins, alkaloids, and amines. This will be followed by discussion of the pathways of amino acid biosynthesis and degradation. The final section will include discussion of protein turnover and degradation, nitrogen excretion, and interorgan relationships in higher organisms. Emphasis throughout the course will be on hormonal, developmental, and molecular biological aspects of metabolic regulation and evolutionary differences.

611 Molecular Toxicology (also Toxicology 611) Spring. 2 credits. Prerequisite: full-year 400-level course in biochemistry. S-U grades optional. Offered alternate years.

612 Methods of Assessing Physical Growth in Children Spring. 3 credits. Limited to graduate students and students who have permission of the instructor. S-U grades optional.
Lec, T 1:25, labs, R 1:25–4:25, disc, T 2:15–3:05. J. Haas. A laboratory course to train students in methods and techniques used to assess the physical growth and development of children. The methods explored are those applicable for field or community studies and cover anthropometry, body composition, skeletal age, maturity indicators, physical fitness, and energy expenditure.

613 Obesity and the Regulation of Body Weight (also Psychology 613) Spring. 3 credits. Limited to 30 students. Prerequisites: one course in psychology and one course in nutrition. Undergraduate students may register with permission of instructor. S-U grades optional. Offered alternate years; next offered 1988–89.
TR 1 3:00–3. D. Levitsky. This course is a multidisciplinary discussion of the causes, effects, and treatments of human obesity. Topics include the biopsychology of eating behavior, genetics of obesity, role of activity and energy metabolism, psychosocial determinants of obesity, anorexia nervosa, therapy and its effectiveness, and social discrimination.

614 Topics in Maternal and Child Nutrition Fall. 3 credits. Prerequisites: NS 331, and 222 or 347, Biological Sciences 311, and permission of instructor.

616 Readings in Food Fall. 2 credits. Prerequisite: organic chemistry. Recommended: biochemistry. S-U grades optional. May be repeated for credit with permission of instructor.
W 7:30–9:25 p.m. N. Mondy. Critical review of selected topics in the current literature. Emphasis on experimental data and basic scientific principles underlying modern theory and practice relative to food quality. Training in oral and written presentations of scientific reports.

617 Teaching Seminar Fall or spring, first half of semester. 1 credit. Limited to division graduate students and students who have permission of the instructor. S-U grades only.
W 7:30–9:30 p.m. M. Devine, D. Taylor-Way. A series of workshops focusing on development of teaching skills for guiding classroom learning in lecture, discussion, and laboratory settings. Preparation of content, presentation, and interaction techniques and evaluative methods are emphasized in relation to the student’s specific teaching assignment. Videotape simulations provide opportunity for practice and analysis of teaching behaviors.

618 Teaching Experience Fall or spring. No credit. Limited to division graduate students and students who have permission of instructor.
Hours to be arranged. Division faculty; M. Devine, T. Levitsky. Designed to provide experience in teaching nutritional sciences by direct involvement in college courses under supervision of a faculty member. The aspects of teaching and the degree of involvement vary depending on the needs of the course and the experience of the student.

619 Field of Nutrition Seminar (also Animal Science 619) Fall or spring. No credit. S-U grades only.
M 4:30. Faculty and guest lecturers. Lectures on current research in nutrition.

620 Food Carbohydrates (also Food Sciences 620) Spring. 2 credits. Prerequisites: Biological Sciences 330 or equivalent. Letter grades only. Offered alternate years; next offered 1988–89.
TR 11-15. J. Brady, B. Lewis, R. Shallenberger. A consideration of the chemistry of carbohydrates, including sugars and complex carbohydrates (starches, pectins, hemichelluloses, gums, cellulose, and conjugated carbohydrates). Emphasis is on intrinsic chemistry, functionality in food systems, and changes occurring during food processing and storage.

625 Special Topics in Food Fall. 2 credits. Hours to be arranged. G. Ambruster, B. Lewis. Current research related to food is reviewed in the context of basic principles and their application to the quality of food.

627 Special Topics in Food Fall. 2 credits. Prerequisite: organic chemistry. Recommended: biochemistry. S-U grades optional. May be repeated for credit with permission of instructor.
W 7:30–9:30 p.m. N. Mondy. Current research related to food production and processing as well as toxicants in the food chain will be reviewed.

Laboratories on the anthropometric, dietary, clinical, and biochemical assessment of human nutritional status. The individual courses are taught in sequence over the entire semester. Any or all of the modules may be taken for credit.

630 Anthropometric Assessment Spring, weeks 1–3. 1 credit. Prerequisites: NS 331 or equivalent and permission of instructor.

631 Dietary Assessment Fall. 1 credit. 7 weeks only. Prerequisites: statistics and NS 331 or equivalent. Enrollment limited.
T 2:30–5:30. D. Sanjur. Study of methods and techniques for assessing dietary intakes at the individual and household levels.

632 Clinical Assessment Spring. 1 credit. Prerequisites: NS 630, 631, and 441; Biological Sciences 330 or 331; NS 332 or Biological Sciences 430; and permission of instructor.

633 Human Metabolic Studies Spring. 1 credit. Prerequisite: NS 331. Limited to 20 students. S-U grades optional.
639 Epidemiology Seminar (also Statistics and Biometry 639) Fall and spring. 1 credit. Limited to graduate students; others by permission of S-U grades only. M 12:20. J. P. Habicht.
This course will develop skills in the preparation and interpretation of epidemiological data by discussing current research topics and issues.

645 Seminar on Community Nutrition Issues Spring. 2 credits. Limited to graduate students with a major or minor in human nutrition who have had a previous course in community nutrition. M 1:15-3. M. F. Sowers.
Students will be actively involved in discussing and undertaking community nutrition needs assessments, program planning and development, evaluation of impact, and the implications of public policy. Students will prepare a proposal as part of the coursework.

646 Seminar in Physiochemical Aspects of Food Fall or spring. 1-3 credits. Prerequisite: a college course in organic chemistry or biochemistry. S-U grades only.
TR 9:05. disc to be arranged. Fall. B. Lewis; spring. R. Parker.
An introduction to physicochemical aspects of food, for graduate students who have had limited or no work in this area. The seminar uses the lectures of NS 246 as a basis for supplementary readings and critical review of research on selected topics.

649 Geriatric Nutrition Spring. 3 credits. Prerequisite: NS 331. Letter grades only.
M W F 10:10, plus 20 hours during the semester working with elderly individuals in the Ithaca area. D. Roe.
Emphasis is given to effects of aging, particularly as these change food habits, alter digestive processes, or decrease nutrient utilization. Causes of nutrient overload and nutritional deficiency are described. Nutritional assessment of elderly people is explained, together with precautions that must be taken in interpreting findings. Consideration is given to geriatric nutrition as a major responsibility of nutritionists working in hospitals, extended-care facilities, and long-term care institutions. Factors that influence the nutritional status of elderly people are discussed, including socioeconomic and maintenance and feeding problems for the elderly.

650 Clinical and Public Health Nutrition Spring. 3 credits. For graduate students with a major or minor in human nutrition. Limited to about 15 grades only.
M W F 9:05. D. Roe.
Lectures cover social, environmental, and disease variables that influence the nutrition of infants, children, and adults. Endemic nutritional problems (such as obesity, dental caries, and anemia) of public health importance in the United States are discussed. Student presentations are made in class. Limited field experience is offered.

651 Nutrition and the Chemical Environment (also Toxicology 651) Fall. 3 credits. Prerequisite: NS 331 or equivalent. S-U grades optional.
M W F 11:5. D. Roe.
The relationship between nutrition and the effects of foreign chemicals. Students are offered an overview of compounds to which we are exposed, including natural food toxicants, food additives, water pollutants, pesticide residues, and radioactive wastes, as well as xenobiotics. A factual as well as scientific background is developed so students can interpret information and misinformation circulated in the news media.

652 Nutrition Counseling Spring. 2 credits. Limited to students in the Clinical Nutrition Program. Prerequisites: NS 441 and 442 and permission of instructor. S-U grades only.
W 10:10-12.05. J. Koch.
Principles and procedures of nutritional counseling in clinical practice. Emphasis on subject matter and process skills necessary to develop, implement, and evaluate nutritional care plans for individuals and groups. Includes workshops, simulation techniques, and work with clients in selected settings.

659 The Nutrition and Physiology of Mineral Elements (also Veterinary Medicine 759) Fall. 2 credits. Prerequisite: one of physiology, intermediate biochemistry, and general nutrition. Offered alternate years; next offered 1988--89. TR 9:05. R. Schwartz; D. VanCampen; R. Wasserman.
Lectures on nutritional and physiological, biochemical, and hormonal relationships of the prominent macro- and microelements, with emphasis on recent developments. Included is information on methodologies of mineral research and the chemistry of ions and complexes, as well as on essentiality, requirements, transport, functions, homeostasis, interactions, and toxicity of various mineral elements.

660 Special Topics in Nutrition Fall or spring. 3 credits maximum each term. Registration by permission of the instructor.
Hours to be arranged. Division faculty.

669 Field Seminar January intersession or spring semester. 1 credit. Limited to 12 students. Required for graduate students in clinical nutrition. Open to other graduate students in nutrition with permission of instructor.
M. Devine; R. Holmes; V. Utermohlen.
Overview of policy decision making and implementation of nutrition programs at the state and national leve's. Seminars alternate between Washington, D.C. (even years), and Albany, New York (odd years). Provides opportunities to meet and confer with staff members of selected governmental and private agencies. Upon their return to campus, students must present an integrated summary report before group discussion.

670 Clinical Field Studies Fall, spring, or summer. 15 credits maximum. Limited to graduate students in clinical nutrition. Prerequisites: NS 441, 442, 652, 630, 631, 632, and 633.
Full-time study at off-campus clinical sites. R. Holmes; V. Utermohlen.
The delivery of nutritional care in hospitals, outpatient clinics, and community settings.

680 International Nutrition Problems, Policy and Programs Fall. 3 credits. Prerequisite: permission of instructor.
Designed for graduate students who want to learn about the important international problems of developing countries. The major emphasis is on nutrition and poverty and their underlying causes are discussed. Emphasis is placed on programs and policies that can assist poor countries and communities to improve their nutritional and health status.

681 Nutritional and Public Health Importance of Human Parasitic Infections Fall. 2 credits. Prerequisite: graduate student status or permission of instructor. S-U grades optional. Offered alternate years. Not offered 1988--89. M 1:25-3:20. L. Stevenson and staff.
Reviews the scientific evidence for relationships between human nutritional status and common human parasitic infections. Concentrates on malnutrition (protein-energy malnutrition, anemia) in developing countries. Parasitic infections emphasized are malaria,
hookworm, ascariis, schistosomiasis, and gastronenteritis. Formal is lecture-demonstration-laboratory.


T 7:30–9:30 p.m. D. Zilversmit. Quantitative analysis of the transport and distribution of nutrients, metabolites, and drugs in multicompartamental systems. The material will be presented as lectures, discussion groups, and problem sets.

683 Field Studies in International Nutrition Fall. No credit. Limited to graduate students with major in international nutrition or permission of instructor. S-U grades only.

Hours to be arranged. 10 class hours on 2 or 3 Saturdays. L. Stephenson. Reviews practical considerations in conducting field research in developing countries, including (1) seeking funding (where, how, when), (2) experimental design issues (choice of population, design, sample sizes, ethics), (3) choice of procedures (laboratory and other), and (4) planning for and carrying out data collection (including specifics of purchasing equipment and supplies; transport of equipment, self, and data; health precautions; and data collection and coding). Extensive handouts. Lecture/demonstration/discussion.

690 Seminar on Nutrition and Behavior (also Psychology 690) Spring. 3 credits. Prerequisite: a course in psychology NS 361, and permission of instructor. S-U grades optional. Offered alternate years.

T 1:30–3. D. Levitsky. The seminar this year covers several current topics in nutrition and behavior. These topics include early nutritional insult and mental development, malnutrition and behavior, nutrition and learning, food additives and hyperkinesia, megavitamin therapy, inborn metabolic defects and mental illness, nutrition and depression, and hypoglycemia.

695 Seminar in International Nutrition, Agriculture, and Development Policy (also International Agriculture 695) Spring. 3 credits. Prerequisite: permission of instructor. W 11:15–12:45. J. Brun and international agriculture and nutrition faculty. Concentrates on major issues in food and nutrition policies as they relate to agriculture. Issues include Africa's nutritional and agricultural decline,lessons from socialist countries, the cash crop-food crop debate, land reform, the Green Revolution, "operation flood" and price policies, and the nutritional impact of agricultural programs. Emphasis is placed on agricultural policies that are leading to growth and equity.

699 Special Topics in International Nutrition Fall and spring. 2 credits. Registration by permission of the instructor. This option is designed for graduate students who want to become familiar with some specific topic related to international nutrition. The instruction usually consists of individual tutorial study involving extensive use of existing literature. In certain semesters it may consist of a lecture or seminar course on a subject such as nutrition and parasitology or the nutritional problems of some geographic region. On occasions it may involve laboratory or field studies. Because the topics may change, this course may be repeated for credit.

700 Current Topics in Toxicology (also Toxicology 698) Fall or spring. 1–3 credits. S-U grades optional.

Hours to be arranged. Staff. A discussion of the most current developments in various areas of toxicological research and testing. Faculty and students will participate jointly in evaluating research findings and provide seminars and discussion of such material. For information regarding topic, instructor, and credit, contact the office of the Graduate Field of Environmental Toxicology, 257 Clark Hall, 255-6047.

702 Seminar in Toxicology (also Toxicology 702) Fall or spring. 1 credit. S-U grades only.

T 12:20 or W 12:20. Division faculty.

999 Master's Thesis and Research Fall or spring. Credit to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional. Hours to be arranged. Division graduate faculty.

999 Doctoral Thesis and Research Fall or spring. Credit to be arranged. Prerequisite: permission of the chairperson of the graduate committee and the instructor. S-U grades optional. Hours to be arranged. Division graduate faculty.

Faculty Roster

Arion, William J., Ph.D., U. of N. Dakota, Prof.
Armbruster, Gertrude, Ph.D., Washington State U. Assoc. Prof.
Bensadoun, Andre, Ph.D., Cornell U. Prof., Nutritional Sciences/Physiology.
Bisogni, Carole, Ph.D., Cornell U. Assoc. Prof.
Brink, Muriel S., M.S., Michigan State U. Assoc. Prof.
Brun, Thierry, Ph.D., U. of California, Berkeley. Visiting Prof.
Campbell, T. Colin, Ph.D., Cornell U. Prof.
Chen, Junshi, M.D., Peking Medical College, China. Adjunct Prof.
Devine, Marjorie M., Ph.D., Cornell U. Prof.
Gillespie, Ardyth, Ph.D., Iowa State U. Asst. Prof.
Haas, Jose D., Ph.D., Pennsylvania State U. Assoc. Prof.
Habicht, Jean-Pierre, Ph.D., Massachusetts Inst. of Technology. James Jamison Professor of Nutritional Epidemiology.
Kazarinoff, Michael N., Ph.D., Cornell U. Asst. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology.
Levitsky, David A., Ph.D., Rutgers U. Assoc. Prof.
Lewis, Bertha A., Ph.D., U. of Minnesota. Assoc. Prof.
Mondy, Neil I., Ph.D., Cornell U. Prof.
Morris, Mary A., Ph.D., U. of Wisconsin. Prof.
Nesheim, Malden C., Ph.D., Cornell U. Prof.
Olson, Christine M., Ph.D., U. of Wisconsin. Assoc. Prof.
Parker, Robert S., Ph.D., Oregon State University Asst. Prof.
Pinsstrup-Andersen, Per, Ph.D., Oklahoma State U. of Agriculture and Applied Science. Prof.
Sanjur, Diza M., Ph.D., Cornell U. Prof.
Sowers, Mary F., Ph.D., U. of Iowa. Asst. Prof.
Sanjur, Lani, Ph.D., Cornell U. Asst. Prof.
Stipanuk, Martha H., Ph.D., U. of Wisconsin, Asst. Prof.
Thorbecke, Erik, Ph.D., U. of California. H. E. Babcock Professor of Economics and Food Economics.
Utermoehlen, Virginia, M.D., Columbia U. Assoc. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology.
Zilversmit, Donald B., Ph.D., U. of California. Prof., Nutritional Sciences/Biochemistry, Molecular and Cell Biology.

Joint Appointees

Krook, Lennart P., Prof., New York State College of Veterinary Medicine/Nutritional Sciences.
Miller, Dennis, Asst. Prof., Food Science/Nutritional Sciences.
VanCampen, Darrel R., Assoc. Prof., U.S. Plant, Soil, and Nutrition Laboratory/Nutritional Sciences.
VanSoest, Peter J., Prof., Animal Science/Nutritional Sciences.
Wasserman, Robert H., Prof., New York State College of Veterinary Medicine/Nutritional Sciences.
Officer Education

Lieutenant Colonel Clarence R. Buchwald, United States Army, Professor of Military Science and Commanding Officer, United States Army ROTC Instructor Group

Military instruction began at Cornell University in 1868 under the provisions of the Morrill Act of 1862. Since that time, officer education has been highlighted by the construction of Barton Hall in 1919, establishment of a formal Reserve Officers Training Corps (ROTC) unit in 1916, and graduation of a program that de-emphasizes drill and formations and places greater stress on the development of leadership and managerial skills. Throughout the years Cornell's program of officer education has trained many outstanding civilian and military leaders well equipped for success as a result of knowledge and skills gained from their involvement in the Officer Education Program while pursuing undergraduate and graduate degrees. The programs of officer education allow the student to prepare for a career in either the United States Army, Navy, Marines, or Air Force. Each service program is headed by a senior military officer who also serves as a full professor on the Cornell faculty.

Military Science

Lieutenant Colonel Clarence R. Buchwald, Field Artillery, United States Army, Professor of Military Science and Commanding Officer, U.S. Army ROTC Instructor Group

Captain Ken C. Williams, Infantry, United States Army and National Guard

Major John M. Graham, Medical Service Corps, United States Army Reserve

Captain Steven A. Barrows, Field Artillery, United States Army

Captain John M. Keefe, Engineer, United States Army

Captain Octavia L. Parker, Adjutant General, United States Army

United States Army ROTC Program

The primary objective of the Army Officer Education Program at Cornell is to commission the officer leadership of the United States Army. Intermediate cadet classes are to provide students with an understanding of the fundamentals of responsibility, integrity, and self-discipline, as well as an appreciation of the citizen's role in national defense. The application of the decision-making process to a variety of situations is given major emphasis as a valuable aid in developing leadership potential.

These objectives are achieved through a program normally covering four years. However, a two-year program is available and is discussed in a later section. The program includes specific courses in military science, more general academic subjects that assure a well-rounded education, practical training in leadership through participation in the Cadet Corps (including attendance at a one-week summer camp at an Army installation), and the opportunity to participate in a number of extracurricular activities. The combination prepares the student for commissioning and effective performance in most of the many branches of the Army. The student's academic major, academic performance, leadership ability, and personal desires and the needs of the Army determine the branch of the Army in which he or she is commissioned upon graduation.

Requirements for Enrolling

Applicants must be citizens of the United States. (Noncitizens may enroll and will receive certificates acknowledging completion of the course but do not receive commissions.)

An applicant's vision must be correctable to a minimum of 20/20 in one eye and 20/400 in the other eye. Height must be at least sixty inches for men, fifty-eight inches for women, and no more than eighty inches for men and seventy-two inches for women, although exceptions will be considered. The student's visual acuity varies according to height and sex. Overall sound mental and physical condition is essential, and students are required to undergo periodic physical examinations. Enrollment in the program is subject to the approval of the professor of military science. Enrollment in specific courses by students not formally enrolled in the program must be approved by course instructors.

Four-Year Program

The Four-Year Program is open to students in their freshman year or, with the approval of military and university authorities, to sophomores in a five-year degree program. Veterans of the Armed Forces of the United States and students entering Cornell with AROTC credit from secondary or military schools (Junior Division AROTC) may receive advanced standing.

Under the Four-Year Program students pursue the Basic Phase (Mil S I and II) during the first two years, and the Advanced Phase (Mil S III and IV) during the next two years. A total of twelve credits of military subjects is required. In addition, academic-enrichment courses are required in such fields as communication, psychology, management, political science, and foreign languages. Specific requirements are determined by the student and his or her adviser after initial enrollment. Throughout the four years, cadets spend an additional two hours each week each semester in practical leadership training for which there is no academic credit. All cadets attend a six-week camp, with pay, between the junior and senior years.

Basic Phase (Mil S I and Mil S II)

Students in the first year of the Basic Phase take one classroom course in military science in the fall and spring semesters, for which they receive academic credit. These courses include study of the United States organization for defense, principles and techniques of leadership and management. Students also participate in leadership modules that include rappelling, orienteering, drill and ceremony, physical training, winter survival, and map and compass use. These modules are designed to promote personal development and enrichment. While they do not receive academic credit for these activities, students receive extra ROTC credit. Typical freshman participation in Army officer education is 48½ program-related hours.

During the fall of the second year, the student takes a three-credit class in military history, including the evolution of warfare and armed conflict in society. In the spring, the student takes a one-credit course in map reading and spends approximately two hours a week in practical leadership training, land navigation, and military skills.

Advanced Phase (Mil S III and Mil S IV)

The Advanced Phase of the Four-Year Program is open to students who have successfully completed the Basic Phase and are accepted by the professor of military science for further enrollment. It is also open to students who have gained appropriate advanced standing through either successful completion of basic summer programs (see the description of the Two-Year Program) or prior military training. Any student entering the Advanced Phase must have two years of academic work remaining at Cornell or another degree-granting institution. The student must pass such physical and aptitude tests as may be prescribed. In addition, the past performance and desire of each student is evaluated to determine if he or she has the potential for eventual commissioning.

When students are accepted for the Advanced Phase, they enter into a contract with the United States government. Under terms of the contract, they agree to complete the Advanced Phase and to accept a commission if tendered. Concurrently with the signing of the contract, students enlist in the United States Army Reserve for control purposes.

Classroom study in the Advanced Phase includes one military science course each semester on such subjects as leadership and management, small-unit tactics, and command and staff organization and functions. The two hours a week of practical leadership training continues, and between the junior and senior years all cadets attend a six-week advanced summer camp currently conducted at Fort Bragg, North Carolina.

Two-Year Program

The Two-Year Program consists of the last two years (the Advanced Phase) of the regular Four-Year Program. In order to qualify for the Two-Year Program, a student must successfully complete a basic six-week summer camp or receive placement credit for prior military service.

The Two-Year Program is open to selected students who have two years of academic study remaining at Cornell or any other baccalaureate degree—granting institution. Applications are accepted October to April from eligible students. In the event of a basic six-week camp before registering in the Advanced Phase the following fall, they must also meet specified physical requirements and execute the same written contract as those students who enter the Advanced Phase after completing the regular Basic Phase.

Scholarships

Scholarships are awarded on the basis of merit and are available for one, two, three, or four years. AROTC scholarships are awarded each year to outstanding basic camp participants and students in the freshman and sophomore classes. Cadets who are awarded scholarships continue to receive support until graduation as long as they fulfill the requirements. Scholarship cadets receive funding for university tuition, required fees, required textbooks, and classroom materials for the duration of their scholarship. Scholarship cadets and advanced course cadets also receive $100 a month for up to ten months a year.

Commissioning

All students who successfully complete the Advanced Phase, including the advanced summer camp, are commissioned as second lieutenants in the United States Army Reserve or the Regular Army upon graduation.

Distinguished Military Graduates

Selected senior cadets with high academic achievement and outstanding military qualities are designated Distinguished Military Graduates after fulfilling all obligations for a baccalaureate degree. All cadets, scholarship and nonscholarship, are eligible to compete for this distinction.

Service Obligations

A variety of active duty and reserve combinations are available. The manpower requirements of the U.S. Army and the qualifications of the cadets determine the assignment.

An officer beginning active duty first attends the Basic Officer Course (normally eight to twelve weeks) of the assigned branch. Upon completion of this course the officer is assigned to a unit and location that is determined by the desires of the individual and the requirements of the Army. Those officers selected for reserve duty attend the Basic Officer Course, after which they are released to reserve status.
Choice of Branch
Cadets in the second year of the Advanced Phase (normally the senior year) may specify the branch of the Army—such as Infantry, Corps of Engineers, Armor, Signal Corps, Artillery, Air Defense, Ordnance, Chemical, Adjutant General, Quartermaster, Finance, Medical Service, Military Intelligence, Military Police—in which they prefer to serve. They are notified in the spring, before commissioning, of the branch to which they are assigned. The likelihood of appointment in a chosen branch depends upon the student’s academic and officer education performance, degree area, and the needs of the Army at that time.

Graduate Study
Active duty deferrals may be granted to individuals who want to attend graduate school at their own expense. Requests will be considered on the basis of needs of the service. Admission to graduate school is the student’s responsibility.

Benefits
Each cadet in the Advanced Phase (Mil S II and Mil S IV) receives $100 a month for up to ten months a year. While attending the advanced summer camp (between the junior and senior years), each cadet receives approximately $600 and an allowance for travel to and from camp. Each semester approximately $380 is provided to textbooks, supplies and fees.

A cadet in the Two-Year Program receives the same payments as cadets in the Advanced Phase and, in addition, receives approximately $450 and a travel allowance for basic summer camp attendance before entering the Advanced Phase.

Military Science Courses
All cadets take one course and a laboratory module each semester in military science. The number of hours a week spent in the classroom varies from semester to semester, according to the credit received for each course. Students in the Four-Year Program are required to take courses as noted below. Students in the Two-Year Program are required to take all of the courses listed for the junior and senior year and the military history course.

Freshman Year (Mil S I)

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Fall</th>
<th>Credit</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>Mil S 101</td>
<td>United States Organization for Defense</td>
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<td>Staff</td>
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<td>Students</td>
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Sophomore Year (Mil S II)

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<tbody>
<tr>
<td>Mil S 211</td>
<td>Armed Conflict and Society</td>
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Junior Year (Mil S III)

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<td>Mil S 332</td>
<td>Theory and Dynamics of the Military Team</td>
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Senior Year (Mil S IV)

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<tbody>
<tr>
<td>Mil S 424</td>
<td>Contemporary Military Environment I</td>
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Practical Leadership Training

All Army Officer-Education Students

In the leadership laboratory, all of these objectives are accomplished by emphasizing practical exercises and firsthand experience. Types of practical laboratory activities include an introduction to rifle marksmanship, mountaineering, physical training, land navigation and orienteering, signal communications, tactics, and orientation and training exercises at military installations.

As with many laboratory periods, no credit is given, and participation is required for successful completion of the AROTC program. Students will receive physical education credit for the laboratory. Students register as follows:

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<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Fall</th>
<th>Credit</th>
<th>Requirement</th>
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<tbody>
<tr>
<td>Mil S I</td>
<td>Leadership Laboratory I</td>
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Mil S II Leadership Laboratory II

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Naval Science

Captain Edward W. Colbert, Jr., United States Navy, Professor of Naval Science and Commanding Officer, Naval ROTC Unit

Commander Max R. Tea, United States Navy

Major Ronald Dutil, United States Marine Corps

Lieutenant Martin Ledger, United States Navy

Lieutenant Michael Kurtz, United States Navy

Lieutenant Christopher Carver, United States Navy

The objective of the Naval Officer Education Program is to prepare selected students for service as commissioned officers in the United States Navy or United States Marine Corps by supplementing their undergraduate education with instruction in essential concepts of naval science and fostering development in the qualities of leadership, integrity, and dedication to naval professionalism.

Naval Science 365
the Navy or Marine Corps. Financial support is
earned.

Officer Education Program

The Naval Officer Education Program provides eight
programs

The objective is achieved through a broad program,
offering a scholarship, more than 90 percent have been
successful in obtaining one.

Non–naval officer education students. Though the
Navy program has been designed to prepare future
officers, Navy courses are open to all students at
Cornell University as space limitations allow.

Requirements for Enrollment

An applicant for Naval ROTC at Cornell must be a
citizen of the United States. Applicants must have
nenrolled in the College Program at Cornell.

First, by applying for the national competition each year.
This entails filling out and sending an appropriate
application, being interviewed, having a physical
examination, and applying to, and being accepted by,
one of the NROTC colleges or universities throughout
the country.

Second, by enrolling in the College Program at Cornell
and being recommended by the professor of naval
science for a scholarship after at least one semester in
the program.

Third, by entering through the Two-Year Scholarship
Program.

Programs

There are two types of Navy programs: the Scholarship
Program and the College Program. They differ primarily
in benefits to the student and type of commission
earned.

Scholarship Program

The Naval Officer Education Program provides eight
thousand scholarships in over sixty-four universities
nationwide to selected students who want to serve in
the Navy or Marine Corps. Financial support is
provided students during college preceding the award
of the baccalaureate degree.

Benefits

The program provides uniforms, full tuition, most
instructional fees, textbooks, nonconsumable supplies,
and $100 a month for a maximum of forty months.

Active Duty Requirements

As required by Section 2107 Title 10, United States
Code, selected applicants must enlist in the United
States Naval Reserve for six years in pay grade E-1
(seamen recruit) before being appointed midshipman.
Officer Education Program

Summer Training

Each summer, students in the Scholarship Program
spend approximately four to six weeks on a Navy ship,
the unit sail-training vessel Vindicator; or with a naval
activity anywhere in the world for on-the-job training.
College Program students attend at least one summer
training session of the same duration between the
junior and senior years. While attending summer
training sessions, midshipmen are paid approximately
$600 a month.

Active Duty Requirements

As required by Section 2107 Title 10, United States
Code, selected applicants must enlist in the United
States Naval Reserve for six years in pay grade E-1
(seamen recruit) before being appointed midshipman.

Officers commissioned in the Regular Navy or Marine
Corps serve on active duty for a minimum of four years.
Those commissioned in the Naval or Marine Corps
Reserve serve three years on active duty. Specialized
training following commissioning adds additional active
duty requirements in some cases.

Choice of Assignment

Graduates have an opportunity to request the duty they
prefer upon graduation. These requests are given
careful consideration, and every effort is made to
assign the newly commissioned officer the duty of his
or her choice.

Among the types of assignments are duty in nuclear-
power engineering for surface ships and submarines,
naval aviation, and large and small surface ships.

Marine Corps Options

The United States Marine Corps is an integral part of
the Naval Service and is commanded by the
Commandant of the Marine Corps. One-sixth of the
NROTC scholarship students may be Marine selectees
who will be designated Marine-option midshipmen.

Upon successful completion of the program, they will be
appointed second lieutenants in the United States
Marine Corps.

Marine-option midshipmen will follow the same
program as other NROTC midshipmen for the first two
years. Beginning with the junior year, Marine-option
midshipmen will be taught Marine courses by a Marine
officer instructor. For the first class summer-cruise (after
the junior year), known as the Bulldog Cruise, Marine-
option students will travel to Quantico, Virginia, where
they will undergo six weeks of intensive training. Upon
commissioning the following year as second
lieutenants, they will be assigned to the Basic School at
Quantico, Virginia. After the Basic School, the Marine
officer is assigned duty in a variety of occupational
fields. Among the duties available are Infantry, Aviation,
Electronics, Supply, Administration, and Computer
Science. The officer may serve on board naval vessels
or at shore installations of the Marine Corps or Navy, in
this country or overseas.

The Marine Corps has a postgraduate educational
system similar in objectives and organization to that of
the Navy. Marine officers selected for aviation receive
flight training at the Naval Air Station, Pensacola,
Florida, along with their Navy counterparts.

Curriculum

A student has three categories of requirements to fulfill
as a midshipman in the Naval Officer Education
Program. The first of these requirements is a weekly
naval professional laboratory each semester. The
second requirement is a naval science course each
semester. The last set of requirements consists of other
required courses prescribed by the Navy to meet the
growing need for more and better technically educated
junior officers.

Naval Professional Laboratories

Nav S 141–142, 241–242, 341–342, or 441–442
All students in the naval program participate in one
ninety-minute laboratory session each week. The
sessions are held from 2:30 until 4:00 on Wednesday
afternoon. This period is planned and implemented for
the most part by the midshipmen officers in the
battalion organization and consists of both drill and
professional information briefings and underway training
aboard the unit’s sixty-foot seagoing sail-training yawl
or five small sailboats. Students gain experience in
actual leadership situations and at the same time learn
the fundamentals of seamanship, military formations,
movements, commands, discipline, courtesies, and
honors. During information briefings special emphasis
is given to applied leadership as it relates to the
administrative and managerial aspects of a Navy or
Marine Corps officer’s duties.

Naval Science Courses

All Navy and Marine midshipmen take one naval
science course together each semester during their
freshman and sophomore years. Navy-option students
continue to take a naval science course each semester
during their junior and senior years. Marine-option
students are required to take only the amphibious
warfare course in either their junior or senior year,
depending on when the course is offered. The number
of hours a week spent in the classroom varies semester
to semester, as does the credit received for each

Freshman Year

Nav S 101 Fundamentals of Naval Science
Fall. No credit.
One-hour class each week (lecture-recitation). Navy
staff.
A study of fundamental aspects of naval science,
including its conceptual contributions to sea power,
factors involved in the physical development of naval
forces, resources that must be managed, and
prospects for the future.

Nav S 102 Naval Ship Systems (also Mechanical
and Aerospace Engineering 101) Spring. 3 credits.
Three lecture-recitation classes each week.
Prof. R. L. Wehe, Navy staff.
An introduction to primary ship-systems and their
interrelationships. Basic principles of thermodynamics,
propulsion, mechanical operation, internal
communications, electronics, ship structure, and other
marine systems are considered.

Nav S 157 Principles of Sailing
Fall and spring.
Physical education credit.
One class each week. Navy staff.
Instruction in basic sailing skills and safety principles.
Students sail small and large boats on Cayuga Lake, weather permitting. Focus is U.S. Navy Class B inshore sailing. The principles and theories used in the development of naval weapons systems are examined. Initially, extensive study is made of sensing and detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, tracking, stability, and weapons control and delivery. The latter part of the course covers the formal derivation of the fire-control problem and specific U.S. Navy weapons.

Nav S 201 Naval Weapons Systems Fall. 3 credits. Prerequisites: Mathematics 111 or 191. Lecture-recitations, MWF. Navy staff. The principles and theories used in the development of naval weapons systems are examined. Initially, extensive study is made of sensing and detection systems, especially radar and sonar, followed by discussions of ancillary systems for computing, tracking, stability, and weapons control and delivery. The latter part of the course covers the formal derivation of the fire-control problem and specific U.S. Navy weapons.

Nav S 202 Seapower—The Historical Utilization of Naval Forces in Foreign Diplomacy Spring. 3 credits. Three seminars each week. Navy staff. Discussions examine the history of the Navy as a force in diplomacy. Relationships between Congress and the military for determining the national defense policy are also explored. The last section of the course concentrates on the balance between the superpower navies today. An integrated examination of current events and issues gives a historical perspective throughout the course.

Junior Year (Navy)

Nav S 301 Principles of Navigation (also Agricultural Engineering 305) Fall. 4 credits. Four classes each week (lecture-recitation-project work). The course covers coordinate systems, chart projections, navigational aids, instruments, compass observations, tides and currents, and soundings. It also includes celestial navigation, time, spherical trigonometry, motion of the stars and sun, star identification, position fixing, use of the nautical almanac, electronic navigation systems, and air navigation.

Nav S 302 Naval Operations Spring. 3 credits. Three lectures each week. Navy staff. The course covers the application of command and control principles and the integration of sensors and weapon systems in the conduct of naval operations. Visual and electronic communications methods, data-systems employment, tactical disposition of forces, and fleet logistics support are studied. Topics in shiplanding are also discussed.

Senior Year (Navy)

Nav S 401 Organizational Behavior and Small Group Processes (also Hotel Administration 414) Fall. 3 credits. Current research is examined to provide a conceptual framework for understanding group processes within organizations. In addition, students participate in experiential laboratories aimed at enhancing their understanding of naval administration and for use in the role of the division officer in counseling his subordinates. Through the use of lectures, situation problems, and role-playing, the student will learn about the various aspects of Navy management and administration.

Additional Required Course

This course may be taken at any time during a student’s undergraduate academic career.

Nav S 310 Armed Conflict and Society Fall. 3 credits. 3 classes each week. Presentations by Marine Corps and Navy instructors with guest lecturers, primarily from government and history departments. A study of modern warfare that examines the relationship of military strategy to geography, economics, sociology, technology, and national political realities and values; the evolution of warfare, including principles of war, weapons, and associated equipment; and the effects of nuclear weapons and guerrilla warfare on traditional concepts of rational strategy.

Junior or Senior Year (Marines)

Nav S 410 Amphibious Warfare Spring. 3 credits. Three lectures-recitations each week. Marine Corps staff. The history of the development, theory, techniques, and conduct of amphibious operations in the twentieth century. Special emphasis will be on amphibious operations conducted in the central Pacific during World War II.

Other Required Courses

Navy Option

In order to receive commissions in the United States Navy, midshipmen must complete all the requirements for a baccalaureate degree as well as certain academic requirements specified by the Navy. Most fields of study for majors leading to a baccalaureate degree and having a direct applicability for the unrestricted line are permitted with the approval of the professor of naval science. Examples of fields of academic study of interest to the Navy for educating officers of the unrestricted line are:

- Asian studies
- chemistry
- computer science
- economics
- engineering
- European studies
- foreign affairs
- history
- Latin American studies
- physics
- public administration
- Soviet studies

Although there are few restrictions placed upon Navy-.option College Program students (or any Marine-option students) with respect to academic majors, it is important to understand the vital need for mathematics and science in the modern Navy. College Program students who want to be most competitive for a scholarship are encouraged to select majors in those fields listed above.

Other required courses depend on the commissioning program in which the Navy-option midshipmen are enrolled and are given in the following sections.

Scholarship Program Navy-Option Students

All Navy-option scholarship students must complete two semesters of science-level calculus (six credits minimum) by the end of the sophomore year and two semesters of calculus-based physics (six credits minimum) by the end of the junior year.

Scholarship Program Navy-Option students who do not major in chemistry, engineering, mathematics, physics, computer science, oceanography, operations analysis, or the physical sciences must also select technical courses for 50 percent of all electives not required by the University academic program or by the NROTC program courses.

College Program Navy-Option Students

College Program students who desire entry into the Navy-option Scholarship Program should fulfill all of the requirements applicable to Navy-option scholarship students to be eligible and competitive for a Professor of Naval Science (PNS) scholarship.

Marine Option

Any Navy midshipman, in either the Scholarship Program or the College Program, who completes all of Cornell University’s degree requirements in any academic major is eligible for a commission in the United States Marine Corps or United States Marine Corps Reserve. Marine-option students take the same naval science courses and naval professional laboratories as Navy-option students for the freshman and sophomore years. During the junior and senior years, Marine-option students meet with the Marine officer instructors one hour each week and take two naval science courses. In addition, two semesters of any course (a minimum of three hours each) in the following subject areas are required, the intent being to broaden the base of knowledge of the individual. The specific course chosen must be approved by a Marine Officer Instructor (MOI).

University Courses

A wide range of courses satisfy Naval ROTC science and engineering electives or social sciences and humanities requirements. Students should consult their naval science instructor or adviser concerning appropriate course selections. A partial list of those Cornell University courses that meet academic requirements of the program follows:

- Calculus
  - Math 111, 112 or 122 Calculus
  - Math 191, 192, or 193 Calculus for Engineers
- Physics
  - Phys 112, 123 or 217
  - Phys 207–208 Fundamentals of Physics
- Chemistry
  - Chem 103–104 Introduction to Chemistry
  - Chem 207–208 General Chemistry
  - H Adm 171–172 Food Chemistry
- Computer Science
  - Engr 100 Introduction to Computer Programming
  - Com S 101 The Computer Age
  - Com S 102 Introduction to Microcomputer Applications
  - Com S 211 Computers and Programming
  - Com S 314 Introduction to Computer Systems and Organization
- M&AE 489 Computer-aided Design
- Com S 436 Introduction to Computers in Planning
- H Adm 174 Information Systems
- Ag En 151 Introduction to Agricultural Engineering and Computing
- Ag En 153 Engineering Drawing
- I&LR 211 Economic and Social Statistics

Extracurricular Activities

The Navy ROTC student at Cornell is offered a broad range of activities in which to participate. Each summer, as an optional part of their summer training, midshipmen sail aboard the unit sail-training vessel Vindictor to distant ports of call. Back at Cayuga Lake,
a highly respected sail-training program offers instruction, both in small sailboats and in large boat sailing on board Vindicatior, to all who want to participate. The unit offers a comprehensive sports program in which most midshipmen participate. The Navy won the Independent Division All Sports Trophy for seven of the last eight years. Midshipmen participate in a myriad of social events, including the annual Navy ball, the Tr-Service military ball, and traditional naval mess nights.

Department of Aerospace Studies

Colonel Robert W. Sample, United States Air Force, Professor of Aerospace Studies and Commander, Air Force ROTC Detachment 520

Major Paul D. Decker, United States Air Force

Captain James Marchio, United States Air Force

Captain Cheryl R. Andrews, United States Air Force

Captain Peter Sefcik, United States Air Force

The objective of the Air Force Officer Education Program at Cornell is to prepare men and women for positions as officers in the United States Air Force. The program is designed to provide the student with a background of aerospace knowledge and to further develop qualities of leadership, integrity, and self-discipline. The objectives are achieved through Four-Year and Two-Year programs. These programs include specific courses in aerospace studies and practical laboratories.

Entering students are assigned to one of four categories: flying (pilot-navigator), missile, engineering-science, and nontechnical. These assignments are based on the student's preferences, qualifications, and academic field of study and the needs of the Air Force.

Requirements for Enrollment

The Air Force officer education program is open to any undergraduate or graduate student enrolled in any major field of study. The student's academic course of study is often a prime factor in determining the kind of career pursued in the Air Force. (See Air Force Careers, below.) Applicants must be United States citizens. Noncitizens may apply and will receive certificates acknowledging completion of the course but cannot receive a commission.

Applicants who are interested in flying (as pilot or navigator) or missile duty should make that request known at the time they enter the program. All applicants receive physical examinations at no cost and, to be accepted, must meet the physical requirements listed below.

Though the program is designed to prepare future Air Force officers, Department of Aerospace Studies courses are open to all students at Cornell.

Physical Requirements

Every applicant must be free from any limiting physical infirmity and must have normal hearing, blood pressure, and heartbeat. Weight must be normal for height and age. Following are the additional specific requirements for nonflying categories:

Vision: bilateral distant vision without corrective lenses, at least 20/400.

Height: for men, at least sixty, but not more than eighty, inches; for women, at least fifty-eight, but not more than seventy-two, inches.

Allergy: no history of asthma since twelfth birthday.

Dental health: good.

Vision: (for pilot candidates) 20/20 bilateral near and far vision without corrective lenses; (for navigator candidates) bilateral near vision at least 20/20 without corrective lenses and bilateral far vision at least 20/70 without correction, providing it is correctible to 20/20 with lenses.

Color vision: normal.

Height: at least sixty-four, but not more than seventy-six, inches; sitting height not more than thirty-nine inches.

Allergy: no history of allergy or hay fever since twelfth birthday.

Dental health: good.

Four-Year Program

The Four-Year Program is open to all freshmen. Sophomores may enter the program but require departmental approval. Students in a five-year degree program may enroll in their freshman or sophomore year. Veterans of the United States armed forces and students entering Cornell from military schools may receive advanced standing, subject to approval by the professor of aerospace studies.

The Four-Year Program consists of the General Military Course (GMC) and the Professional Officer Course (POC). The first year of the GMC carries no military commitment, and students may withdraw at any time. The Four-Year Program is designed to provide the student with a background of aerospace knowledge and to further develop qualities of leadership, integrity, and self-discipline. The objectives are achieved through Four-Year and Two-Year programs. These programs include specific courses in aerospace studies and practical laboratories.

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Vision: bilateral distant vision without corrective lenses, at least 20/400.

Height: for men, at least sixty, but not more than eighty, inches; for women, at least fifty-eight, but not more than seventy-two, inches.

Allergy: no history of asthma since twelfth birthday.

Dental health: good.

Vision: (for pilot candidates) 20/20 bilateral near and far vision without corrective lenses; (for navigator candidates) bilateral near vision at least 20/20 without corrective lenses and bilateral far vision at least 20/70 without correction, providing it is correctible to 20/20 with lenses.

Color vision: normal.

Height: at least sixty-four, but not more than seventy-six, inches; sitting height not more than thirty-nine inches.

Allergy: no history of allergy or hay fever since twelfth birthday.

Dental health: good.

Four-Year Program

The Four-Year Program is open to all freshmen. Sophomores may enter the program but require departmental approval. Students in a five-year degree program may enroll in their freshman or sophomore year. Veterans of the United States armed forces and students entering Cornell from military schools may receive advanced standing, subject to approval by the professor of aerospace studies.

The Four-Year Program consists of the General Military Course (GMC) and the Professional Officer Course (POC). The first year of the GMC carries no military commitment, and students may withdraw at any time. The General Military Course

Students in the General Military Course take one credit of classroom work offered by the Department of Aerospace Studies each semester. During the freshman year the student examines the organization and mission of the United States Air Force and the role United States military forces in the contemporary world. In the sophomore year the student studies the history and development of military aviation and American air power. In both years officership, professionalism, and human rights within the United States Air Force are emphasized.

Students also spend 1 1/2 hours a week in a leadership laboratory, which includes classroom instruction in responsibilities and the environment of the junior officer and instruction and practice in basic drill and ceremonies. In addition, all students participate in summer field training for four weeks between their sophomore and junior years.

Professional Officer Course

The Professional Officer Course (POC) is a two-year advanced course of instruction. Students who are accepted for the POC must have successfully completed or validated the basic course and must meet the academic and physical standards. Each cadet accepted into the POC must sign an agreement to complete the program and accept, if tendered, a commission in the Air Force Reserve on graduation. Classroom study in the POC requires three hours a week each semester. In the junior year, cadets study Air Force leadership and management at the junior officer level. During the senior year cadets study the elements of national security and the place of the military in American society. The basic course requires a minimum of 1 1/2 hours a week in the junior and senior years. In the leadership laboratory the cadet is exposed to advanced leadership experiences and applies the principles of management learned in the classroom.

Two-Year Program

The Two-Year Program consists of the last two years (Professional Officer Course) of the regular Four-Year Program plus a six-week summer training course preceding the freshman year. (Details of the Professional Officer Course are given above.) The Two-Year Program is open to male and female students with two years of academic study remaining at Cornell (graduate or undergraduate) or at schools under crosstown or consortium agreement.

Applications are accepted from October through April of the year preceding the applicant's planned entry into the program. Selectees are then required to successfully complete a six-week summer training program at government expense.

Scholarships

Air Force ROTC offers four-year scholarships on a competitive basis to high school seniors and graduates who will major in selected scientific and technical areas such as engineering, mathematics, meteorology, and computer science. Scholarship information can be obtained from a high school counselor, from Air Force ROTC officers at a campus offering Air Force ROTC, or from AFROTC/RROO, Maxwell AFB, AL 36112-6663. The deadline for submission of applications is December 1 of the year preceding the academic year in which a student wants to enter the program. Students should apply early.

Scholarships for 3½, 3, 2½, and 2 years are also available to college students. There are also two- and three-year scholarships for qualified men and women who are pursuing selected medical and nursing degrees.

All scholarships help pay college expenses and provide a $100 monthly nontaxable allowance during the school year.

Applications for the scholarships should be made to the professor of aerospace studies during the freshman or sophomore years of college. Appropriate application information is furnished by the professor of aerospace studies at the Air Force ROTC detachment. Selections are based on scores achieved on the Air Force Officer Qualifying Test, the overall grade point average, and the rating from an interview board composed of institutional officials and Air Force ROTC staff officers.

Fees

A uniform deposit of $30 a year is required. Students are also encouraged to contribute to a cadet activities fund to cover the cost of most of their social activities.

Benefits

All cadets in the advanced program (POC) receive a $100-a-month, nontaxable subsistence allowance for the academic year. During the four- or six-week summer field training (see below), each cadre receives the pay allowance authorized by current directives, plus an allowance for travel to and from the field site. Most textbooks and supplies required for Department of Aerospace Studies courses are provided.

All cadets are eligible to participate in field trips made to Air Force bases throughout the continental United States. Students in a five-year degree program are entitled to space-available travel on Air Force aircraft flying within the continental United States.

Field Training

There are three types of field training: a four-week course for cadets in the Four-Year Program; a six-week course for Two-Year Program applicants; and a special five-week course for pilot candidates. Students in any of these programs normally attend field training between their sophomore and junior years. Field training is hosted each summer by several active Air Force installations.

Field training is designed to stimulate the development of military leadership and skills through meaningful experiences. The curriculum consists of aircraft, aircrew, and survival orientation; junior officer training; physical training; small arms training; a social-actions program; and supplemental training. Special emphasis is placed on career orientation and interaction with other young officers in fields of interest to the student. The six-week training program is unique because it has an additional sixty hours of academic course work similar to that taken during the freshman and sophomore years.
The five-week pilot program includes, in addition to the four-week curriculum, flight instruction consisting of ground school and flight training in a light aircraft. Ground school provides a basic understanding of aircraft systems, aerodynamics, flight instruments, air navigation (including radio navigation), meteorology, weather services, the national airspace system, federal aviation regulations, medical factors affecting flight, flight preparation, airport operations, and emergency procedures. On completion of this flight-training program, a cadet may continue training at his or her own expense for a private pilot’s license through the Federal Aviation Administration.

In addition to field training, Army airborne training (parachute jumping instruction) is available as an extracurricular activity to selected volunteer cadets.

**Advanced Training Program**

This program allows selected cadets to go to active duty Air Force bases for a two- or three-week period during the summer following their junior year. As “third lieutenants,” cadets receive specialized career orientation and an opportunity to experience leadership, human relations, and management challenges encountered by Air Force junior officers. Cadets have an opportunity to become familiar with the Air Force great way of life. They also receive pay and allowances while attending advanced training.

**Commissioning Obligations**

All students who successfully complete the AFROTC advanced program (POC) and who are awarded a baccalaureate degree are commissioned as second lieutenants in the Air Force.

Second Lieutenants commissioned in nonflying categories are required to serve on active duty for four years. Pilot trainees are required to serve on active duty for eight years after completing flying training and receiving their aeronautical rating. Navigator trainees serve five years after completing training. Some newly commissioned officers are allowed to postpone active service to earn advanced degrees.

**Air Force Careers**

Air Force policy has been to assign new officers to a career field appropriate to their educational background. Students in the engineering-scientific category may be assigned to practice in their specialty in research and development, communications, aeronautics, astronautics, design and development, the biological sciences, computer design and maintenance, meteorology, or various other engineering and scientific fields. They will try out with highly qualified people and have access to the latest scientific facilities and equipment.

Any undergraduate major is suitable for those who are qualified and interested in becoming pilots or navigators. After completion of flying training they are assigned primary duties flying various kinds of aircraft.

Officers who elect missile duty will train and be assigned to one of the operational missile bases as a crew member. This type of assignment provides an opportunity for a young officer to obtain command experience and also enjoy the extra option of enrolling in a graduate program.

Those graduating in the nontechnical category can anticipate assignments in manpower management, administration, logistics, police and investigation, intelligence, personnel, transportation, information, and numerous other career fields. They will use their educational backgrounds in positions of responsibility and be given the opportunity to develop further their managerial and administrative skills.

**Curriculum**

Students in the Four-Year Program are required to take all courses listed below. Students in the Two-Year Program are required to take all of the courses listed for the junior and senior years.

### Freshman Year

**Air S 161 United States Military Forces** 1 credit.

One class each week.

A study of current United States military forces with emphasis on the analysis of the doctrine and mission of the United States Air Force. Army and Navy operations, as contributions to the total national defense, are reviewed. Current factors affecting today’s professional military officers are considered.

**Air S 162 Aerospace Operations** Spring. 1 credit.

One class each week plus a field trip to a local military installation.

The aerospace forces of the United States are studied with emphasis on the organization and resources of the United States Air Force. The elements of strategic offensive and defensive general-purpose and aerospace support forces throughout the world are also studied.

### Sophomore Year

**Air S 211 Development of Military Aviation** Fall. 1 credit.

One class each week.

Factors leading to the development of aviation and the concepts and doctrine for the employment of air power are studied. Topics to be reviewed and analyzed include the history of manned flight, the effects of World War I on the uses of aviation, and the development of pre–World War II aircraft and the political struggles for an independent United States air arm. The role of air power in World War II, including strategic bombing, tactical air power, and the role of air superiority in warfare, is examined.

**Air S 212 American Air Power since 1947** Spring. 1 credit.

One class each week.

The employment of the Air Force since World War II in military and nonmilitary operations to support national objectives is discussed. Effects of technology on defense policy and strategy are reviewed. The part played by the air forces in activities such as the Berlin airlift and national and international relief missions is discussed. The role of air power in the Korean conflict, the Cuban crisis, and the Vietnam War is examined from the viewpoint of technology and tactical doctrine.

### Junior Year

**Air S 331 Leadership and Communicative Skills** Fall. 3 credits.

Three classes each week.

The course is divided into three major parts. Part one provides an introduction to the principles and techniques used in the development of effective communication skills through the use of the interpersonal communication model. Part two explores the impact that both individual and group behavior have on organizational goals, with special emphasis on management theories that have evolved to explain human motivation. Part three deals with leadership as a function of the management principle of directing. Attention is given to the impact that various leadership styles have on human motivation and organizational effectiveness. Current leadership research and theory and the responsibilities of command are considered.

Case-study exercises and oral and written assignments are required.

**Air S 332 Management** Spring. 3 credits.

Three classes each week.

Introductory course that deals with the basic principles of management, including planning, organizing, staffing, and controlling. Students will study quantitative and systems management techniques used to enhance the decision-making process. The role of management in the development of corporate strategy, tactics, and the use of power is considered.

Case studies, problem sets, and oral and written assignments are required.
Department of Physical Education and Athletics

The Program

Cornell is proud of its diversified physical education program—unique in its concept and tradition of excellence—that encompasses over one hundred recreational activities, ranging from the aquatic depths of scuba diving to the heights of mountain climbing. It ranks among the five largest university programs in the nation.

Teaching emphasis in the program is placed on recreational activities that can be continued outside the university. Each member of the instructional staff has extensive experience and skill in the area he or she teaches, and all of the abundant facilities available to the athletics department are used as needed in the program.

This catalog serves only as a guide. Dates, fees, and regulations stated herein are subject to change at any time. Please feel free to check any information at the physical education office in Teagle Hall.

Physical Education Requirements

All undergraduate students admitted to Cornell as freshmen must complete two terms of physical education—normally during the first two terms of attendance.

In addition, the University Faculty Committee on Physical Education has established a basic swimming qualification requirement for all entering freshman students. Normally women take the test in the Helen Newman pool, and men in the Teagle pool, as part of their physical education registration process. The test consists of a continuous seventy-five-yard swim using front, back, and optional strokes and is conducted during the first week of academic classes. All others who have to qualify should contact the physical education office in Teagle Hall (men) or Helen Newman Hall (women) to make an appointment for the swim test. Any student who cannot pass the swim test is required to include swimming 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.

Circumstances permitting exemption from, or postponement of, those requirements are outlined in the section on waiver of requirements.

Transfer Students

Students who transfer to Cornell from another college or university will be given credit for one term of physical education for each full term of academic transfer credit they are granted by Cornell. Any transfer student entering Cornell as a sophomore or higher normally is not required to take physical education classes for credit. Each student should clarify his or her transfer status with the appropriate college office. Transfer students subject to the credit requirement must take the swim test before signing up for an elective.

Waiver of Requirements

A waiver or postponement of physical education requirements may be granted if the student:

1. has a physical handicap or medical affliction, certified by university medical staff, that precludes participation in any physical education activity (the department is prepared to adapt a physical education program to the individual needs of a handicapped student whenever possible); or

2. is committed to twenty hours or more of employment per week (the director of scholarship and financial aid must issue the request for exemption, certifying the necessity for such employment obligations).

Permission for postponement of, or exemption from, the physical education requirements is issued only by the University Faculty Committee on Physical Education or the director of physical education. Final authority for interpreting and ruling on requests for exemption rests with the committee.

Course Registration

Registration for credit for all physical education classes (for men and women) takes place in Teagle Hall gymnasium during the academic course registration period. Dates and times are published with other registration information each semester. All courses for those in the required program are filled on a first-come-first-served basis. A $25 penalty fee is charged by the physical education department for late enrollment occurring immediately after the university's posted registration periods.

Physical education courses may be dropped or added without penalty during the first three weeks of the semester, that must be done at the physical education office in Teagle Hall. Please be alerted to specific courses that list add/drop period other than the first three weeks. In general, such changes will be allowed only if the student has a conflict caused by a change in his or her academic course schedule. Each student may make only one course change per term. The physical education department assesses a $10 penalty fee for a course change made after the three-week drop-add period.

Registration Procedure

After picking up their general registration materials, students enter the west end of Teagle Hall (across Garden Avenue from Barton Hall). Signs in the hall give directions to the gym, which is upstairs. In the gym, students:

1. sign up for a swim test (men sign at the Teagle table; women at the Helen Newman table; nonswimmers do not sign up for a swim test—they go directly to the card files);
2. after obtaining an appointment for a swim test, go to the card file in the center of the gym and receive their permanent yellow record card;
3. hand carry the permanent card to the course table of their choice (when signing up for a course, students should make sure they understand when and where the class will meet, and any fee policy connected with the course);
4. leave the yellow card on the sign-up table after the coach has filled it out.

During spring-term registration, students follow steps two through four above. Students who need to take the swim test during the spring term must arrange an appointment at the swim test appointment table before leaving the gym.

Note: Current and prospective members of intercollegiate teams who need physical education credit must appear at each physical education course registration in Teagle gym to report that they are meeting their requirement through team participation. If for any reason they are dropped from the team roster, they must go immediately to the physical education office in Teagle Hall and report.

Persons registering as noncredit students go directly to the card file in the center of the gym and receive their permanent yellow record card. Noncredit students are not required to take the swim test. Noncredit students are not allowed to make course changes or drop add/drop period courses.

All fees charged for the Greek Peak ski program must be made at the physical education office in Teagle Hall.

2. the participant fails to pass preliminary course requirements; or
3. the participant accumulates a significant number of medically excused absences from the course (the director or assistant director of the physical education program will make the decision in this situation).

Note: All fees charged for the Greek Peak ski program are subject to the regulations of the Greek Peak ski center. Please refer to the information sheet supplied by Greek Peak at spring registration.

Credit

Physical education credit is granted for:

1. satisfactory completion of a course offered through the physical education program;
2. participation on an intercollegiate team as a competitor or manager;
3. participation in the marching band (fall term only);
4. satisfactory completion of a physical education course at a recognized institution provided that (a) a written request to enroll is submitted to, and approved by, the director of physical education at Cornell and (b) a transcript of the in absentia credit is forwarded to the physical education office at Cornell.

Students receive credit for only one course per term. If a student enrolls in more than one course per term, credit will be given only for the first course the student has enrolled in, as recorded in the physical education office. A grade of incomplete received in a physical education course taken for credit must be made up before the end of the following term.

Absences

Students enrolled for credit are allowed three absences without penalty in each twelve-week course. Proportional adjustments will be established by the instructor for courses meeting for more than forty-five minutes at each session or that meet over a period of less than twelve weeks. Each absence due to illness or medical problems that is in excess of the three absences allowed without penalty must be made up.

All medical problems and illnesses that cause absence from classes must be reported to the Gannett Health Center at the time of occurrence. A maximum of eight illness-related absences will be allowed per term before a medical postponement is imposed.

Students enrolled for credit in the Greek Peak ski program will be permitted to make up only one absence; five attendances are required to receive credit for the program. The allowable absence must have been made up by the program's ending date.

Course Fees

Information about fees associated with physical education courses is available at the time of course registration. All fees are billed through the bursar's office. Other participants in courses involving fees usually must pay when they register. Only the person paying the fee will be allowed to use the playing time allotted by the fee. Payment will be waived or refund made only if:

1. the participant withdraws from the course during the designated drop-add period (the withdrawal must be made at the physical education office in Teagle Hall).
2. the participant fails to pass preliminary course requirements; or
3. the participant incurs a significant number of medically excused absences from the course (the director or assistant director of the physical education program will make the decision in this situation).

Note: All fees charged for the Greek Peak ski program are subject to the regulations of the Greek Peak ski center. Please refer to the information sheet supplied by Greek Peak at spring registration.

Credit

Physical education credit is granted for:

1. satisfactory completion of a course offered through the physical education program;
2. participation on an intercollegiate team as a competitor or manager;
3. participation in the marching band (fall term only);
4. satisfactory completion of a physical education course at a recognized institution provided that (a) a written request to enroll is submitted to, and approved by, the director of physical education at Cornell and (b) a transcript of the in absentia credit is forwarded to the physical education office at Cornell.

Students receive credit for only one course per term. If a student enrolls in more than one course per term, credit will be given only for the first course the student has enrolled in, as recorded in the physical education office. A grade of incomplete received in a physical education course taken for credit must be made up before the end of the following term.
Elective Enrollment

Elective (no-credit) enrollment is allowed, and encouraged. A maximum of five absences is allowed per twenty-credit coordinator (a proportional adjustment is made for courses meeting less often). Penalty for noncompliance is a $10 fee.

Faculty, staff, their spouses, and college-age dependents are welcome to participate in the physical education program wherever class space is available. A general registration fee of $50 is charged in addition to any specific course fees.

These fees are to be paid by cash or check at the time of course registration.

Facilities

Teagle Hall, at the corner of Garner Avenue and Schoellkopf Drive, is the administrative headquarters for the physical education and athletics program. Department offices (telephone: 255-4266) are in the west end of the building. Teagle contains two swimming pools, crew practice tanks, a wrestling room, weight-lifting rooms, and a steam room. Classes in gymnastics, judo, karate, scuba diving, swimming and water safety, weight lifting, and yoga are held here.

Helen Newman Hall is situated at the end of South Balch Drive (telephone: 255-5133). The building contains a swimming pool, dance studios, sixteen bowling alleys, a large open gym floor, and a sauna room. Classes in aerobics, archery, badminton, basketball, bowling, dance, fencing, physical conditioning, swimming, tennis, and volleyball are held here.

Barton Hall, situated on Garner Avenue opposite Teagle Hall, contains a large open gym floor. Classes in badminton, basketball, hunter safety, jogging, physical fitness, riflery, volleyball, and water aerobics are held here.

Lynah Rink is used for classes in figure skating, hockey, and ice skating, as well as for public skating sessions during scheduled hours from late October until mid-March.

Schoellkopf Hall is used for Nautilus and weight-lifting exercises and first-aid CPR instruction. Classes in racquetball and squash are held in the Gummian Squash Court. Other activities in the program include the Oxley Polo Arena for polo and riding instruction; Moakley golf course for instructional and recreational golf; the Kite Hill indoor tennis bubble; the Tompkins County Rod and Gun Club for skeet and trapshooting; and Greek Peak, Virgil, New York, for skiing.

Schedules for use of all athletics facilities can be obtained from the Teagle Hall and Helen Newman Hall main offices.

Use of Facilities and Equipment

In the event conflict arises between the use of department equipment or facilities, physical education classes have priority. The director or assistant director of physical education will assign priorities when necessary. The Department of Athletics and Physical Education is not responsible for any personal items left in any of its buildings or facilities.

Equipment Issued to Students

All students taking classes for credit are entitled to use of a basket and combination lock and a soap user’s card. Baskets for men and women are available in Teagle Hall and are assigned to new students during academic registration. There are baskets for women only in the main locker room in Helen Newman Hall.

assignment procedures are the same as for Teagle Hall.

Baskets are issued on a first-come-first-served basis, beginning during academic registration week. Each student may receive a towel when he or she attends class. There is no charge for the basket, lock, or towel provided they are returned to the department at the appropriate time. If any of these items is lost, the replacement cost will be charged to the student’s bursar account.

Each student will provide his or her own appropriate gym uniform (socks, shorts, T-shirt, sneakers, etc.) for classes when needed. Students can rent a solid-color gymn uniform for use during the term from the locker-room staff in Teagle Hall.

Students are allowed to borrow small equipment items, such as basketballs, volleyball, skis, ropes, punching-bag gloves, or horseshoes, from their locker-room equipment areas. The student’s identification card will be held by the department as security while the item is in use.

Use of Swimming Facilities

All students may use the swimming facilities in Teagle Hall or Helen Newman Hall between classes, during the noon hour, and at established hours during the evening on weekends. Faculty and staff who have Teagle Hall seasonal memberships may use the Teagle pools during those periods also. Faculty and staff who do not have seasonal membership may use the Helen Newman pool (by paying an hourly fee) or the Teagle pools during designated hours. Specific times are established each term for coed swimming and for family swim nights. Schedules for the use of the pools are available in the main offices of Teagle and Helen Newman halls.

Women using the Teagle pools must supply their own swimsuits (caps are not required); they may change and shower in the locker rooms at the west end of the building, facing Barton Hall. Towels are provided.

Teagle Hall does not provide hair dryers, but electrical outlets are available for personal dryers in the locker rooms. Swimmers using the Helen Newman pool must provide their own swimsuits.

All persons using swimming facilities are required to take a thorough shower immediately before entering the pool and to obey the orders of the lifeguards at all times. Swimming is allowed only when a lifeguard is on duty.

Courses

The courses and fees described in this catalog are subject to change or cancellation at any time by official action of Cornell University.

Enrollment in any course is limited by the space available. Other restrictions are included in the course description. All courses are coeducational. The specific time and place of class meetings, as well as information about fees, are available at physical education course registration. Course fees are billed through the Office of the Bursar.
**Aquatice Courses**

**Beginning Swimming** Fall and spring.
- Two classes a week, Helen Newman Hall and Teagle Hall.
  - Instruction and practice in basic skills leading to passing the basic swimming proficiency test.

**Advanced Beginning Swimming** Fall and spring.
- Two classes a week. Helen Newman Hall and Teagle Hall.
  - This course is ideal for all who have taken one term of Beginning Swimming, regardless of whether the swimming test was successfully completed. Areas of special emphasis are the crawl stroke and rotary breathing, back crawl, sidestroke, breaststroke, diving, treading water, and underwater swimming. The primary objective of the advanced beginning swim course is to strengthen the student's confidence and competence.

**Intermediate Swimming** Fall and spring.
- Two classes a week. Helen Newman Hall and Teagle Hall.
  - Practice and perfection of basic skills and five basic strokes.

**Advanced Swimming** Fall and spring.
- Two classes a week. Helen Newman Hall and Teagle Hall.
  - Practice and perfection of the eleven basic strokes.

**Diving** Fall and spring.
- Two classes a week. Teagle Hall.
  - Instruction in all the basic dives, including front (pike and layout), back, and front and back somersaults.

**Weight Training** Fall and spring.
- Two classes a week. Cumnthorpe Court Squash, Classes for all levels of play. Equipment is furnished.

**Scuba Diving** Fall and spring. Fee charged.
- Teagle Hall.
  - Program includes skill training in a pool and open-water training in Cayuga Lake. P.A.D.I. certification awarded upon successful completion.

**Advanced Open-Water Scuba Diving** Fall and spring. Fee charged.
- Advanced level open-water training in Cayuga Lake. For those who have completed the basic course.

**Aquatic Conditioning**
- Fall and spring. Fee charged.
  - This course is offered during intersession periods. One week of sailing and diving in the Bahamas. See the information sheet at the registration table.

**Beginning Synchronized Swimming** Fall.
- Two-hour class one evening a week, Helen Newman Hall.
  - Sculling stunts, including the tub, marlin, log roll, front and back tuck somersaults, and front and back pikes.

**Advanced Synchronized Swimming** Fall.
- Two-hour class one evening a week, Helen Newman Hall.
  - Preparing, practicing for, and presenting an aquatic show.

**Cardiopulmonary Resuscitation (CPR)**
- Fall and spring. No credit. Fee charged.
  - One class a week for four weeks, Schoellkopf Hall. American Red Cross CPR certification is awarded on satisfactory completion of the course.

**Fencing**
- Fall and spring. Fee charged.
  - Two classes a week. Helen Newman Hall.
  - Includes warm-up exercises and all basic offensive and defensive moves. Equipment is furnished.

**Fencing II** Fall and spring. Fee charged. Prerequisite: Fencing I or the equivalent.
- Two classes a week. Helen Newman Hall.
  - Interclass competition is stressed. Equipment is furnished.

**Golf**
- Fall and spring. Fee charged.
  - Two classes a week. Moakley Hall.
  - Instruction by PGA professionals is geared to all levels of experience and ability. The objective is to give beginners enough skill to play, and to give more-advanced players direction in their thinking, practice, and play through a thorough understanding of fundamentals. Equipment is furnished.

**Recreational Golf**
- Fall and spring. Limited to students who are experienced golfers. Fee charged.
  - Moakley golf course.
  - Students must provide their own clubs. Twelve rounds of nine holes each must be played to complete the program.

**Yoga**
- Fall and spring. Fee charged.
  - Two classes a week. Barton Hall and track.
  - A program to meet the needs of each participant. Increases capacity from jogging a few hundred yards to three miles at the end of twelve weeks.

**Weight Training**
- Fall and spring. Fee charged.
  - Two classes a week. Cumnthorpe Court Squash.
  - Classes for all levels of play. Equipment is furnished.

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- Fall and spring. Fee charged.
  - Two classes a week. Cumnthorpe Court Squash.
  - Classes for all levels of play. Equipment is furnished.
Jogging Tours  Fall.  
Three classes a week for seven weeks, Barton Hall. 
Each class consists of a three-to-five-mile jogging tour of a local area.

Karate Shito Ryu

Basic Karate  Fall and spring. Fee charged.  
Two evening classes a week, Teagle Hall.  
A beginning course taught by professional staff.

Advanced Karate  Fall and spring. Fee charged.  
Two evening classes a week, Teagle Hall.  
Open to those who have taken Basic Karate or the equivalent.

Outdoor Program

Hiking in the Finger Lakes Region  Fall and spring.  
Includes four weekend days of hiking.

Backpacking in the Finger Lakes Region  Fall and spring.  
Classes lead to a full weekend on the trail.

Natural History—Environmental Awareness  Fall and spring.  
For those interested in the local ecology.

Wilderness Skills  Fall and spring.  
Includes a wilderness expedition during fall break or spring break.

Basic Rock-climbing Skills  Fall and spring.  
No experience required.

Meets one afternoon a week for eight weeks.

Shawangunks Rock-climbing Expedition  Fall and spring.  
Includes a four-day climbing camp.

Technical Ice-climbing  Spring.  
Includes four weekend days of climbing.

Bicycling  Fall and spring.  
Afternoon or weekend rides. No overnights.

Bicycle Touring  Fall and spring.  
Rides lead to overnight weekend tours.

Flat-Water Canoeing  Fall and spring.  
Afternoon or weekend outings to local lakes.

Canoe Expeditioning  Fall and spring.  
Outings finish with an Adirondacks expedition.

White-Water Canoeing  Fall and spring.  
Includes three days of white-water trips.

White-Water Kayaking  Fall and spring.  
Includes three days of white-water trips.

Adirondack Ski Expedition  Winter break.  
Ten-day winter camping and skiing trip.

Outdoor Leadership  
For those interested in becoming outdoor program instructors.

Wyoming Wilderness Expedition  Summer.  
Full-time course for the entire month of June.

Cross-Country Skiing I and II  Spring.  
Six 3-hour classes. Meets once each week immediately following spring registration.  
Van transportation provided for groups of twelve students and two instructors. Ski rental optional.

Backcountry Ski Touring  Spring.  
Four full-day weekend outings. Emphasis on backwoods touring. Ski rental optional.

Relaxation and Stress Management  Fall and spring.  
Two classes a week, Barton Hall.  
Introduction to basic relaxation techniques for the reduction of everyday stress. Techniques will be taught that can be used in normal everyday living situations.  
See the brochure Cornell University Outdoor Program at registration for more information about courses.

Riflery  
Riflery  Fall and spring. Fee charged.  
Two classes a week, Barton Hall.  
Instruction and practice in the techniques of target riflery from various shooting positions.

Skeet and Trapshooting  Fall and spring. Fee charged.  
Two-hour class one afternoon a week, Teagle Hall.  
Includes lectures and shooting at the Tompkins County Rod and Gun Club range. Guns and shells are furnished.

Hunter Safety  Fall and spring.  
Hours to be arranged, Barton Hall.  
Instruction in hunter safety leads to New York State certification for bow and gun.

Basic Pistol  Fall and spring.  
Barton Hall range.  
Instruction in the use of the pistol in the three modes of fifty-foot competitive target shooting—slow fire, timed fire, and rapid fire. Emphasis placed on safety and responsibility while firing.

Sailing  
Principles of Sailing  Fall and spring. Fee charged.  
One class a week, Cayuga Lake.  
Instruction in basic sailing skills and safety principles. Students sail small and large boats on Cayuga Lake, weather permitting.

Intermediate Sailing  Spring. Fee charged.  
One class a week, Cayuga Lake.  
Instruction in more-advanced techniques for those already familiar with the basic principles of sailing.

Skating  
Introduction to Skating  Fall and spring.  
For beginning to intermediate skaters. Fee charged.  
Three classes a week, Barton Hall.  
Students provide their own hockey skates or rent them at Lynah Rink.

Beginning and Low-Intermediate Figure Skating  Fall and spring. Fee charged.  
Three classes a week for half a term, Lynah Rink.  
Instruction and practice in basic figure skating techniques: forward and backward, crossovers, turns, and spirals. Students provide their own figure skates or rent them at Lynah Rink.

Intermediate and Advanced Figure Skating  Fall and spring. Limited to experienced skaters. Fee charged.  
Three classes a week for half a term, Lynah Rink.  
Advanced figure skating techniques. Students provide their own figure skates or rent them at Lynah Rink.

High-Intermediate and Advanced Figure Skating  Fall and spring. Fee charged.  
Three classes a week, Lynah Rink.  
Advanced figure skating techniques. Students provide their own figure skates or rent them at Lynah Rink.

Introduction to Ice Hockey  Fall and spring. Fee charged.  
Two classes a week, Lynah Rink.  
Stick handling, passing, and shooting are stressed. Students provide their own skates and sticks; all other equipment is furnished.

Intermediate Hockey  Fall and spring. Fee charged.  
Prerequisite: Beginning hockey or participation in organized hockey.  
Two classes a week. Lynah Rink.  
This course is designed for the intermediate hockey player. Advanced techniques taught include positioning, power play, penalty killing, and offensive and defensive attack. Each session emphasizes game situations and scrimmaging. Skates and hockey sticks must be supplied by the participants. All other necessary equipment will be supplied.

Skiing  
Skiing Conditioning  Fall.  
Two classes a week, Helen Newman Hall.  
Exercises designed to increase flexibility, strength, and endurance in preparation for the ski season.

Downhill Skiing  Spring. Fee charged.  
One class a week, Greek Peak.  
Transportation, instruction, ski-lift fees, and skiing time are offered in a package deal. Greek Peak personnel are present at registration to explain the program and accept fees. Bus transportation to Greek Peak is provided six afternoons a week for six weeks.

T’ai Chi Chuan  
T’ai Chi Chuan I and II  Fall and spring.  
Three classes a week, Teagle Hall.  
Introduction to T’ai Chi, a system of graceful, slow-movement exercises that aim at nurturing relaxation, deep breathing, and improved circulation.

Kung Fu  Fall and spring.  
Two classes a week, Teagle Hall.  
Exploration of conditioning and fitness procedures used in the major martial arts, such as karate or judo. Covers circular movement for generating strong blocks, kicks, and punches.

Self-Defense for Women  Fall and spring. Fee charged.  
Hours to be arranged, Teagle Hall.  
Basic methods of physical protection for women.

Martial Arts and Aerobic Exercises  Fall and spring.  
Three classes a week, Teagle Hall.  
Bend of ten basic martial-art techniques in a framework of rhythmic exercises.

Tennis  
Indoor Tennis  Spring. Fee charged.  
Two classes a week, Kite Hill tennis bubble.  
Classes for all levels of play. Emphasizes strategy for intermediate and advanced groups. Space limitation requires doubles play.

Beginning Outdoor Tennis  Fall.  
Three classes a week for half a term, Helen Newman courts.  
Instruction and practice in basic strokes (forehand, backhand, serve).

Intermediate Outdoor Tennis  Fall.  
Three classes a week for half a term, Kite Hill courts.  
Use of fundamental strokes, lobs, and drop shots; doubles strategy.

Advanced Outdoor Tennis  Fall. Limited to experienced players.  
Three classes a week for half a term, Kite Hill courts.  
Emphasizes strategy.

Volleyball  
Introduction to Volleyball  Fall and spring.  
Two classes a week, Barton Hall.  
Fundamentals of ball handling, serves, defensive blocks, and position play are stressed. Classes will scrimmage.
Intermediate Volleyball  Fall and spring.
   Two classes a week, Helen Newman Hall and Teagle Hall.
   Passing and blocking strategy; scrimmages in class.

Advanced Volleyball  Fall and spring.
   Two classes a week, Helen Newman Hall.
   Offensive and defensive team strategy is emphasized in class scrimmages.

Yoga

Yoga I  Spring. Fee charged.
   Two classes a week, Teagle Hall.
   Fundamentals of hatha-yoga. Covers basic postures, breathing techniques, and deep relaxation. Introduces chanting.

Yoga II  Spring. Fee charged.
   Two classes a week, Teagle Hall.
   Designed for those who have completed Yoga I or its equivalent.

Independent Study

Independent Study  Fall and spring.
Independent study is designed for those who have difficulty fitting any of the regularly scheduled courses into their academic program. Areas to be considered for study are community service programs, personal fitness programs, or outdoor education. A term paper is required. Special permission to enter this program must be granted by the program director.
Division of Summer Session, Extramural Study, and Related Programs

Administration
Robert D. MacDougall, dean
Charles W. Jermy, Jr., associate dean
Joanne E. Davenport, director, Cornell University
Conference Services
Alicia Dowd, media manager
Judith K. Eger, director, Programs in Professional Education
Mary K. Gloster, assistant to the dean
Margaret L. Haine, director, Cornell University Summer College
Ralph Janis, director, Cornell’s Adult University
Valerie A. Setters, division registrar

The Division
The Division of Summer Session, Extramural Study, and Related Programs provides a wide variety of educational opportunities beyond the degree-granting programs of the university. These programs serve virtually all age groups in a great variety of formats and time frames.

Summer Session
The Cornell University Summer Session provides unique and unusually attractive opportunities for study and recreation at a time when the Cornell campus and the Finger Lakes region of central New York are at their loveliest and the Ithaca weather is at its best. Students of all ages—high school juniors, senior citizens, and everyone in between—may choose from a wide variety of courses scheduled during three-, six-, and eight-week sessions, as well as from dozens of special programs of varied lengths. Admission is relatively open and simple. Classes meet daily and are usually kept small to foster a close association between students and teachers. For more information, students should consult the Summer Session Office, B12 Ives Hall, or call 255-4987.

Extramural Study
The extensive credit-course offerings of the university are available to area residents on a part-time basis. Those interested may apply for admission to practically any course in the university and will be admitted if they receive the instructor’s written approval. The division also offers an Official Visitor’s Program that allows persons to attend classes in many divisions of the university on a space-available basis at a reduced charge. Visitors are required to obtain written permission of the instructor. In this program no credit is given and no record is kept of attendance or performance. During the January intersession period the division offers credit courses primarily for undergraduates but open to anyone. For further information, students should contact the Extramural Office in B12 Ives Hall or call 255-4987.

Programs in Professional Education
Because of Cornell’s leadership in both theoretical and applied research, the university offers unique opportunities for professional growth and refreshment to persons in science, technology, government, business, and industry. The division’s Programs in Professional Education present intensive updates on specific issues, ideas, and technological advances, involving faculty members whose teaching and research at Cornell center around current and anticipated developments in areas of importance to the corporate sector and the professions. Programs in Professional Education can also respond to the needs and interests of corporate groups or professional societies, developing programs both on and off campus that are suited to their particular educational purposes. For more information, interested persons should telephone 255-7259.

Cornell’s Adult University
Cornell’s Adult University (CAU) offers one-week noncredit academic courses on campus during the summer and weekend seminars at off-campus locations during the fall and spring. Originally conceived as a program for alumni, CAU has greatly broadened its mission in the area of adult education. All courses and seminars are inspired by the belief that learning never ends and that one of the roles of a great university is to provide a bridge between traditional, formal education and informal, noncredit study. For more information, interested persons should consult Cornell’s Adult University, 626B Thurston Avenue, or call 255-6260.

Conference Services
Excellent facilities, a beautiful campus, and a special learning environment make Cornell an ideal setting for conferences and meetings. Professional groups from all over the country come to Cornell to take advantage of this special learning environment. The staff is available to answer questions, advise on creative program ideas, assist in planning, make special arrangements, secure accommodations, and handle other administrative details. Every effort is made to ensure the success of each conference. For more information about conferences at Cornell, interested persons may consult Cornell University Conference Services, Box 3, Robert Purcell Union, or call 255-6290.

Continuing Education Information Service
The Continuing Education Information Service provides free information, counseling, and referral to men and women who have been out of school for several years and want to resume their education. Anyone who wants to take courses, begin an undergraduate or graduate degree program, or complete an unfinished degree is welcome to use the services of the center.

The center provides information on all schools and departments of the university; opportunities for part-time and full-time study; special courses, workshops, seminars, and community resources available to older students. A small library includes information on continuing-education research, adult learning and development, educational opportunities at local institutions of higher learning, financial aid, work-study programs, and admission procedures. For further information, interested persons should contact Continuing Education Information Service, B12 Ives Hall, or call 255-4987.

Summer Courses
The Cornell University Summer Session always offers a wide variety of courses. Among these are a number of courses that are usually offered every summer. The list that follows includes those courses that are likely to be offered during the summer of 1988. The list is not exhaustive; many additional courses that are offered only occasionally or for the first time are not listed. For further information, students should contact the Summer Session Office, B12 Ives Hall, or call 255-4987. The 1988 Announcement of Summer Session will be published in February.

Africa Studies and Research Center
131–132 Swahili
204 History and Politics of Racism and Segregation
422 African Literature
470 Nineteenth-Century Resistance Movements in Africa
484 Politics, Conflict, and Change in South Africa

Anthropology
102 Introduction to Anthropology: Social-Cultural Perspectives on Mankind
201 Ancient Maya Civilization
424 Myth, Ritual, and Sign

Archaeology
201 Ancient Maya Civilization
243 The History and Archaeology of Ancient Israel to 450 B.C.E.

Architecture
125 Introduction to Architecture
Consult the Department of Architecture office for a complete list of summer design offerings.

Art
105 Articulating the Visual Experience
121 Introductory Painting
123 Landscape Painting
132 Introductory Graphics
141 Introductory Sculpture
151 Introductory Drawing
158 Conceptual Drawing
159 Life and Still-Life Drawing

161 Introductory Photography I
168 Black-and-White Photography
169 Color Photography
261 Photography II
376 Summer Session, Extramural Study, and Related Programs

Photography III

Astronomy
An Introduction to the Universe
Essential Ideas in Relativity and Cosmology

Biological Sciences
General Biology
Biomedical Ethics
Basic Histology Techniques for Light Microscopy
Plant Biology
General Ecology
Principles of Biochemistry, Lectures
Comparative Vertebrate Ethology
Omnithology

Chemical Engineering
Mass and Energy Balances
Introduction to Chemistry
General Chemistry
Introduction to Experimental Organic Chemistry
Elementary Organic Chemistry
Quantitative Chemistry
Introduction to Inorganic Research
Introduction to Analytical Research
Introduction to Organic Research
Introduction to Research in Physical Chemistry

Classics
Greek
Greek for Beginners
Attic Greek
Latin
Latin for Beginners
Elementary Latin
Classical Civilization
Word Power
Word Power for the Biological Sciences
The Art of Argument: An Introduction to Rhetoric
Classical Civilization

Communication
Theories of Human Communication
Introduction to Mass Media
Writing for Media
Oral Communication
Effective Listening
Photo Communication
Principles of Public Relations and Advertising
Radio and Television Communication
Scientific Writing for Public Information
Writing in the Sciences and Engineering
Communication Planning and Strategy I
Video Communication
Field Research Techniques
Scientific Writing for Scientists

Comparative Literature
Literatures from the Third World
Great Books

Computer Science
Introduction to Computer Programming
The Computer Age
Computers and Programming
Data Structures
Introduction to Computer Systems and Organization
Applied Logic

Economics
Introductory Microeconomics
Introductory Macroeconomics
Principles of Accounting
Managerial Accounting for Planning and Control
Intermediate Microeconomic Theory
Intermediate Macroeconomic Theory
Intermediate Microeconomic Theory (calculus section)
Intermediate Macroeconomic Theory (calculus section)
Introduction to Statistics and Probability
Money and Credit
International Monetary Theory and Policy
Comparative Economics: United States, Europe, and the Soviet Union
Economic Development

Education
Field Experience
Informal Study
Special Topics in Education
Internship in Education
Master's-Level Thesis Research
Doctoral-Level Thesis Research

Electrical Engineering
Microprocessor Systems

English
Writing about Film
Introduction to Rhetoric
Critical Reading and Writing
Writing from Experience
Writing Workshop
The Modern Imagination
Classic American Authors
Modern American Authors
Afro-American Autobiography
Fantasy
Shakespeare
The Reading of Fiction
The Novel in Africa
Creative Writing Workshop
Expository Writing
Fantasy and Horror
Chaucer
The American Renaissance
Verse Writing
The Art of the Essay
Studies in the Novel
Children's Literature

Floriculture and Ornamental Horticulture
Architectural Sketching in Watercolor

French Literature
Introduction to French Literature

Geological Sciences
Introductory Geological Science
Introduction to Historical Geology
Summer Field Geology in Wyoming
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<tr>
<th><strong>Government</strong></th>
<th><strong>Labor Economics</strong></th>
<th><strong>Modern Languages and Linguistics</strong></th>
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<tbody>
<tr>
<td>100.1 Civil Liberties and the Law</td>
<td>240 Economics of Wages and Employment</td>
<td>Chinese</td>
</tr>
<tr>
<td>100.2 Freedom and Justice in the Western Tradition</td>
<td>540 Labor Economics Organizational Behavior</td>
<td>160 Introductory Intensive Chinese (Mandarin)</td>
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<tr>
<td>100.3 Politics and the Law</td>
<td>121 Introduction to Microorganizational Behavior and Analysis</td>
<td>201–202 Intermediate Chinese</td>
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<tr>
<td>111 The Government of the United States</td>
<td>222 Studies in Organizational Behavior</td>
<td>Dutch</td>
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<tr>
<td>131 Introduction to Comparative Government and Politics</td>
<td>371 Individual Differences and Organizational Behavior</td>
<td>[131–132 Dutch Elementary Reading Course Not offered 1988. ]</td>
</tr>
<tr>
<td>161 Introduction to Political Theory</td>
<td>520 Micro Organizational Behavior and Analysis Personnel and Human Resource Studies</td>
<td>English</td>
</tr>
<tr>
<td>181 Introduction to International Relations</td>
<td>361 Managing Human Resources</td>
<td>101–102 English as a Second Language</td>
</tr>
<tr>
<td>310 Power and Society in America</td>
<td>662 Managing an Organization through Simulation Training</td>
<td>211 English as a Second Language</td>
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<tr>
<td>358 Politics of the Middle East</td>
<td>669 Special Topics</td>
<td>215 English for Later Bilinguals</td>
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<tr>
<td><strong>History</strong></td>
<td><strong>Interdepartmental.</strong></td>
<td><strong>German</strong></td>
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<tr>
<td>151/152 Introduction to Western Civilization</td>
<td>150 Labor Problems in American Society</td>
<td>121–122 Elementary German</td>
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<tr>
<td>292 Hiroshima and Nagasaki</td>
<td><strong>Marine Science</strong></td>
<td>123 Continuing German</td>
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<tr>
<td>363 Russian History since 1800</td>
<td>Consult the Shoals Marine Laboratory office for a complete list of summer offerings in marine science.</td>
<td>631–632 Elementary Reading Course</td>
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<tr>
<td><strong>History of Art</strong></td>
<td><strong>Mathematics</strong></td>
<td><strong>Italian</strong></td>
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<tr>
<td>202 Survey of European Art: Renaissance to Modern</td>
<td>107 Finite Mathematics</td>
<td>160 Introductory Intensive Japanese</td>
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<tr>
<td>261 Introduction to Art History: Modern Art</td>
<td>109 Precalculus Mathematics</td>
<td>403 Teaching of Japanese as a Foreign Language Linguistics</td>
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<tr>
<td><strong>Hotel Administration</strong></td>
<td>111–112 Calculus</td>
<td>123 Continuing Russian</td>
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<tr>
<td>161 Keyboarding for Managers on the Macintosh</td>
<td>123 Analytic Geometry and Calculus</td>
<td>101 Spanish Basic Course I</td>
</tr>
<tr>
<td>486 Historical Introduction to Public Hospitality Law and Its Impact on American Society</td>
<td>192 Calculus for Engineers</td>
<td>123 Continuing Spanish</td>
</tr>
<tr>
<td><strong>Human Development and Family Studies</strong></td>
<td><strong>Mechanical and Aerospace Engineering</strong></td>
<td>203 Intermediate Composition and Conversation Spanish</td>
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<tr>
<td>115 Human Development: Infancy and Childhood</td>
<td>302 Technology, Society, and the Human Condition</td>
<td>101 Spanish Basic Course I</td>
</tr>
<tr>
<td>150 Families in Modern Society</td>
<td><strong>Medieval Studies</strong></td>
<td>123 Continuing Spanish</td>
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<tr>
<td>216 Adolescence and Youth: Biological and Cognitive Development</td>
<td>102 King Arthur and His Knights</td>
<td>203 Intermediate Composition and Conversation Spanish</td>
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<tr>
<td>217 Adolescence and Youth: Personality and Social Development</td>
<td><strong>Microbiology</strong></td>
<td><strong>Natural Resources</strong></td>
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<tr>
<td><strong>Human Service Studies</strong></td>
<td><strong>Mechanical and Aerospace Engineering</strong></td>
<td>215 Environment Disruption and Regulation</td>
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<tr>
<td><strong>Industrial and Labor Relations</strong></td>
<td><strong>Microbiology</strong></td>
<td>230 Diet for a Small Planet</td>
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<tr>
<td>Collective Bargaining</td>
<td>290–291 General Microbiology</td>
<td><strong>Near Eastern Studies</strong></td>
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<tr>
<td>100 History of Industrial Relations in the United States</td>
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<td>103 Elementary Hebrew</td>
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<tr>
<td>200/500 Collective Bargaining</td>
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<td>104 Continuing Hebrew</td>
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<tr>
<td>201/501 Labor Relations Law and Legislation</td>
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<tr>
<td>Economic and Social Statistics</td>
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<tr>
<td>510 Introductory Statistics for the Social Sciences</td>
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<td>Course Code</td>
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<td>236</td>
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<td>The History and Archaeology of Ancient Israel to 450 B.C.E.</td>
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<tr>
<td>294</td>
<td>Modern History of the Middle East</td>
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<td></td>
<td><strong>Nutritional Sciences</strong></td>
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<td>415</td>
<td>Field-based Learning in Nutrition</td>
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<td></td>
<td><strong>Operations Research and Industrial Engineering</strong></td>
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<td>260</td>
<td>Introductory Engineering Probability</td>
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<td>270</td>
<td>Basic Engineering Probability and Statistics</td>
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<tr>
<td>622</td>
<td>Operations Research I</td>
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<td></td>
<td><strong>Philosophy</strong></td>
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<tr>
<td>101</td>
<td>Introduction to Philosophy</td>
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<td>Reasoning and Writing</td>
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<td>131</td>
<td>Logic: Evidence and Argument</td>
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<td>Contemporary Moral Issues</td>
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<td>231</td>
<td>Introduction to Formal Logic</td>
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<td>245</td>
<td>Medical Ethics</td>
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<td></td>
<td><strong>Physical Education</strong></td>
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<td>Consult the Physical Education Office for a complete list of summer offerings for credit and recreation.</td>
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<td></td>
<td><strong>Physics</strong></td>
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<tr>
<td>101-102</td>
<td>General Physics</td>
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<tr>
<td>112</td>
<td>Physics I: Mechanics and Heat</td>
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<td>Physics II: Electricity and Magnetism</td>
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<td>214</td>
<td>Physics III: Optics, Waves, and Particles</td>
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<td>400</td>
<td>Informal Advanced Laboratory</td>
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<td>500</td>
<td>Informal Graduate Laboratory</td>
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<td>510</td>
<td>Advanced Experimental Physics</td>
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<td>520</td>
<td>Projects in Experimental Physics</td>
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<td></td>
<td><strong>Psychology</strong></td>
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<tr>
<td>101</td>
<td>Introduction to Psychology: The Frontiers of Psychological Inquiry</td>
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<td>123</td>
<td>Introduction to Biopsychology</td>
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<td>Introduction to Psychology: Personality and Social Behavior</td>
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<td>214</td>
<td>Introduction to Cognitive Psychology</td>
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<td>280</td>
<td>Introduction to Social Psychology</td>
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<td>281</td>
<td>Interpersonal Relations and Small Groups</td>
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<td>325</td>
<td>Introductory Psychopathology</td>
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<td>350</td>
<td>Statistics and Research Design</td>
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<tr>
<td>469</td>
<td>Psychotherapy: Its Nature and Influence</td>
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</tbody>
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**Rural Sociology**

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>101</td>
<td>Introduction to Sociology: Social Structure and Quality of Life</td>
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<tr>
<td>437</td>
<td>Aging: Issues in the 1980s</td>
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</tbody>
</table>

**Sociology**

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>101</td>
<td>Introduction to Sociology</td>
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<td>102</td>
<td>Hard Choices</td>
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<td>Public Opinion</td>
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<td>264</td>
<td>Race and Ethnicity</td>
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<tr>
<td>280</td>
<td>Introduction to Social Psychology</td>
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<tr>
<td>281</td>
<td>Interpersonal Relations and Small Groups</td>
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<tr>
<td>347</td>
<td>Aging: Issues in the 1980s</td>
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**Spanish Literature**

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<th>Course Code</th>
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<tbody>
<tr>
<td>201</td>
<td>Introduction to Hispanic Literature</td>
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**Textiles and Apparel**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>245</td>
<td>Dress: A Reflection of American Women's Roles</td>
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**Theatre Arts**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
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<td>Writing about Film</td>
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<td>200</td>
<td>Introduction to Dance I</td>
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<td>284</td>
<td>Voice and Pronunciation Skills</td>
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<td>287</td>
<td>Summer Acting Workshop</td>
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<td>374</td>
<td>Introduction to Film Analysis: Meaning and Value</td>
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<td>377</td>
<td>Fundamentals of 16-mm Filmmaking</td>
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<td>474</td>
<td>Advanced Film Production</td>
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<td>475</td>
<td>Seminar in the Cinema</td>
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**Theoretical and Applied Mechanics**

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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>202</td>
<td>Mechanics of Solids</td>
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<td>203</td>
<td>Dynamics</td>
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**Women's Studies**

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>245</td>
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</tr>
</tbody>
</table>
New York State College of Veterinary Medicine

Administration
Robert D. Phemister, dean
S. Gordon Campbell, associate dean for academic affairs
Neil L. Norcross, secretary of the college
John A. Lambert, assistant dean for administration
John C. Semmler, assistant dean for external programs and research administration
Marcia J. Sawyer, director of student affairs and admissions
Gloria S. Crissey, registrar, student affairs and admissions

Department Chairmen
Anatomy: A. deLahunta
Avian and Aquatic Animal Medicine: B. Calnek
Clinical Sciences: D. Smith
Microbiology, Immunology, and Parasitology: R. Avery
Pathology: B. Pauli
Pharmacology: G. Sharp
Physiology: R. Wasserman

The College
The College of Veterinary Medicine offers a professional program that requires four years of full-time academic and clinical study of the normal and abnormal structure and function of the animal body and the diagnosis, treatment, and prevention of animal disease.

Graduates of the college receive the Doctor of Veterinary Medicine (D.V.M.) degree, which is recognized by licensing boards throughout the world.

Admission
Graduates generally enter private practice or become engaged in one of the increasing number of other biomedical activities.

Admission requires a minimum of three years of college work, including specific prerequisite courses and experience. Applications must be filed approximately one year before the proposed matriculation date. The competition for admission is keen, since there are many more qualified applicants than can be admitted.

Graduate programs in veterinary research and postdoctoral training in clinical specialties are open to qualified holders of baccalaureate degrees and lead to the degree of Master of Science or Doctor of Philosophy.

Clinical Sciences

Anatomy

500 Gross Anatomy: Small Animal Fall.
501 Gross Anatomy: Large Animal Spring.
502 Microscopic Anatomy First year.
504 Neuroanatomy and Clinical Neurology First year.
505 Applied Anatomy Fall.
506 Applied Anatomy Spring.
507 Animal Development Fall.
508 Anatomy of the Fish and Bird Spring.
600 Special Projects in Anatomy Fall and spring.
601 Research Opportunities in Veterinary Medicine Fall, January, spring, and summer.
602 Advanced Clinical Neurology Fall.
624 Biomechanics and Energetics of Locomotion Spring.

Avian and Aquatic Animal Medicine

255 Poultry Hygiene and Disease Fall.
555 Avian Diseases Fall.
614 Research Opportunities in Veterinary Medicine Fall, January, spring, and summer.
663 Veterinary Medicine in Developing Nations Spring.
671 Diseases of Aquatic Animals Spring.
672 Aquavit I: Introduction to Aquatic Veterinary Medicine Mid-May to mid-June.
673 Aquavit II: Health Management in Confined Populations of Invertebrates and Fish Summer.
674 Avicultural Diseases and Medicine Spring.
770 Advanced work in Avian Diseases Fall and spring.
772 Advanced work in Aquatic Animal Diseases Fall and spring.
773 Advanced Work in Avian Immunology Fall and spring.

Clinical Sciences

475 Health and Diseases of Animals Spring.
520 Preventive Medicine in Animal Health Management Spring.
531 Regulatory Medicine Spring.
545 Clinical Epidemiology Fall.
547 Practice Management Fall and spring.
548 Anesthesiology Fall.
561 Theriogenology I Spring.
562 Theriogenology II Fall.
563 Large Animal Medicine and Surgery Fall.
564 Large Animal Medicine and Surgery Spring.
566 Radiographic Techniques Fall.
567 Clinical Nutrition Fall.
568 Foundations of Clinical Science I Fall.
569 Foundations of Clinical Science II Spring.
570 Theriogenology Service Spring.
572 Senior Seminar Fall and spring.
574 Large Animal Surgery Service Fall and spring.
575 Ambulatory Service Fall and spring.
578 Anesthesiology Service Fall and spring.
579 General Medicine and Surgery Spring.
580 Radiology Service Fall and spring.
581 Animal Nutrition Fall.
582 Large Animal Surgical Exercises Spring.
583 Small Animal Medicine and Surgery Fall.
584 Small Animal Medicine and Surgery Spring.
586 Small Animal Surgical Exercises Spring.
589 Small Animal Medicine Service Fall and spring.
591 Small Animal Surgery Service Fall and spring.
593 Ophthalmology Service Fall and spring.
594 Large Animal Medicine Service Fall and spring.
596 Opportunities in Veterinary Medicine Fall and spring.
598 Dermatology Service Fall and spring.
611 Mastitis January.
615 Research Opportunities in Veterinary Medicine Fall, January, spring, and summer.
644 Introduction to Epidemiology Spring.
665 Advanced Epidemiology Fall.
675 Special Problems in Large Animal Medicine Fall and spring.
677 Special Problems in Large Animal Obstetrics Fall and spring.
678 Fundamental Techniques in Embryo Transfer Spring.
680 Poisonous Plants Fall.
683 Elementary Biostatistics Spring.
684 Horse Lameness Spring.
686 Goats: Management and Diseases Spring.
688 Special Problems in Small Animal Medicine Fall and spring.
690 Veterinary Dermatology Spring.
691 Advanced Large Animal Internal Medicine Problems Spring.
692 Computers in Veterinary Medicine Spring.
693 Professional Development Seminar Fall.
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<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Semester</th>
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<tr>
<td>694</td>
<td>Diseases of Common Exotic Pets</td>
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<td>695</td>
<td>Advanced Equine Surgical Techniques</td>
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<td>766</td>
<td>Graduate Research</td>
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<td>768</td>
<td>Master’s-Level Thesis Research</td>
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Evolution of Color Vision (Biological Sciences 718) Fall.
720 Special Problems in Physiology Fall and spring.
726 Systems Physiology I Fall.
727 Systems Physiology II Spring.
758 Molecular Mechanisms of Hormone Action (also Biological Sciences 658) Spring.
Fundamentals of Endocrinology, Lecture (Animal Science 427) Fall.

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Cummings, John F., Ph.D., Cornell U. Prof., Anatomy.
Dobson, Alan, Ph.D., U. of Aberdeen (Scotland). Prof., Physiology/(Section of Physiology).
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Hall, Charles E., D.V.M., Cornell U. Assoc. Prof., Clinical Sciences.
Hornbeck, Katherine A., Ph.D., U. of Pennsylvania. Assoc. Prof., Physiology/(Section of Physiology).
Houx, T. Richard, Ph.D., U. of Tennessee. Prof., Physiology/(Section of Physiology).
Jacobson, Richard H., Ph.D., Montana State U. Assoc. Prof., Diagnostic Laboratory.
Kallfelz, Francis A., Ph.D., Cornell U. Professor, Clinical Sciences.
Koch, Lennart P., Ph.D., Royal Veterinary Coll. at Stockholm (Sweden). Prof., Pathology.
Kowal, John H., Ph.D., U. of Connecticut. Assoc. Prof., Diagnostic Laboratory.
Langguth, Walter E., Ph.D., U. of Wisconsin. Prof., Physiology/(Section of Physiology).
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Lein, Donald H., Ph.D., U. of Tennessee. Asst. Prof., Microbiology, Immunology, and Parasitology.
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Maylin, George A., Ph.D., Cornell U. Assoc. Prof., Diagnostic Laboratory.
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Noden, N. Sydney, M.S., Cornell U. Asst. Prof., Clinical Sciences.
Norekross, Neil L., Ph.D., U. of Massachusetts. Prof., Clinical Sciences.
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