University of Rochester
The information in this bulletin was prepared in the spring of 1993. Provisions of this publication are not to be regarded as an irrevocable contract between the student and the University. The University reserves the right to make changes in its course offerings, degree requirements, regulations and procedures, and fees and expenses as educational and financial considerations require.

The University of Rochester provides equal opportunity in admissions and student aid regardless of sex, age, race, color, creed, handicap, sexual orientation, and national or ethnic origin. Further, the University complies with all applicable nondiscrimination laws.
Contents

5 General Information About the University Useful for Prospective Students
13 Degrees Offered by the University
17 Facilities of the University
23 Special Academic Opportunities for Undergraduates
29 1993–94 and 1994–95 Academic Calendars

33 College of Arts and Science (including courses in the School of Medicine and Dentistry open to undergraduates)
135 College of Engineering and Applied Science
159 School of Nursing
167 William E. Simon Graduate School of Business Administration
171 Margaret Warner Graduate School of Education and Human Development
175 Academic Services and Information
183 Career and Counseling Services

187 Student Affairs
195 Sports and Recreation
197 Admissions
203 Financing an Education
207 General Regulations
209 Trustees and Administration of the University
210 Campus Map
211 University Buildings
213 Index
216 Abbreviations
The University of Rochester, founded in 1850, is one of the leading private universities in the country—and for undergraduates, it's a university in perfect balance.

Rochester balances the choices and intellectual excitement of a major research university with the intimacy and opportunities for personal involvement of a small liberal arts college.

Rochester's faculty balances its passion for scholarship and research with a commitment to the lasting values of a classic liberal arts education.

The results of the Rochester experience are self-evident in the track record of its alumni—in their careers and in their personal lives. "To put it simply," says one student, "Rochester opens doors.”

For many undergraduates, the Rochester experience means surrounding a chosen major with the related courses that contribute to a broad liberal education. Others choose double concentrations or earn certificates in complementary fields. Still others individually design their own departmental programs.

And Rochester students can also benefit from the offerings of other schools and departments. For example, undergraduates can enroll in graduate courses; premed students can enroll in classes at the medical school or at the Eastman School of Music; future engineers can diversify their studies with an advanced course in Chaucer.

Rochester's opportunities are outlined in the remainder of this book. They include:

- The unique "Take Five" Program, which allows undergraduates to take a fifth year of courses tuition free, in a program that has been cited as one of the more innovative liberal arts programs in the country.
- The Rochester Early Medical Scholars (REMS) Program, which assures selected Rochester freshmen a place in the University of Rochester’s Medical School when they finish the bachelor’s degree. The program frees these students to develop their intellects broadly before they launch into their medical studies.
- New bachelor’s degree programs (B.S. and B.A.) in environmental studies, which reflect growing interest in environmental concerns. These programs are designed to prepare students to deal with environmental issues in their chosen careers.
- The Bachelor of Arts degree in engineering, which recognizes the need for broadly educated decision-makers who are well versed in engineering. The program gives a student substantial technological knowledge and competence while also providing the opportunity for a liberal arts education.
- The Senior Scholars Program, which allows selected undergraduates to devote their entire senior year to a crea-
creative project, whether in the form of scholarly research, a scientific experiment, or a literary or artistic endeavor.

- University Day afternoons (on each Wednesday of the semester), which are reserved for special academic and intellectual events; at most parts of the University, few regular classes are scheduled.

- “Reach for Rochester” employment programs, which offer—regardless of students’ financial needs—a national summer jobs program and paid internship experiences.

There are approximately 4,900 full-time undergraduates and 2,700 full-time graduate students at the University. The great majority of classes are small in size, enabling all students to work closely with their teachers. There is a single faculty for all students; some of the most distinguished senior professors teach beginning courses. Reflecting the personal scale of Rochester’s programs, undergraduates are encouraged to work where possible with individual faculty members in the pursuit of original scholarship.

College students must make two major transitions in their first two years. As freshmen, they make the important leap from high school to college. As sophomores, they make the crucial choice of an academic concentration. The College of Arts and Science’s Dean for Freshmen and Dean for Sophomores, both members of the faculty, take special responsibility for those two important years in students’ careers at the University. Further, a number of faculty members—called Dean’s Fellows—each “adopt” a freshman residence hall to offer informal advice and share recreational events.

An administrative staff also offers support, starting with orientation sessions on campus before the beginning of freshman year. Staff are also available to supply advice on course and major requirements; to help students find paying internships and employment opportunities; and to assist in the development of post-college plans.

Students can’t expect to gain a “Rochester education” simply by studying and attending class. Out-of-class activities—whether they be intramural sports, political clubs, volunteering off-campus, or movies and concerts—are part and parcel of undergraduate life. Moreover, the Rochester region—from the city’s parks, theaters, and shops, to the countryside of the nearby Finger Lakes—offers ample attractions.
THE COLLEGES AND SCHOOLS OF THE UNIVERSITY

The standards for admission to the University are uniform for the College of Arts and Science and the College of Engineering and Applied Science, the two schools enrolling the majority of undergraduates. Therefore, transferring from one college to the other does not require any "readmission" process. Students who haven't yet declared an intended concentration are considered part of the College of Arts and Science. (For information about admission to the School of Nursing, see page 201, and to the Eastman School, page 199.)

The College of Arts and Science (pages 33 to 131) is the oldest of the University's seven academic units. The College provides undergraduate and graduate degree programs in the humanities, natural sciences, and social sciences and remains the home college for most undergraduates during their studies at Rochester.

The College of Engineering and Applied Science (pages 133 to 153) enrolls freshmen who express an interest in concentrating in one of the engineering disciplines. Students may also enroll at any time after their first semester provided that they have the appropriate science and mathematics background and have, or can schedule, the necessary prerequisites for their intended concentration. The College's faculty and staff play an active role in academic advising. The College is accredited for its chemical, electrical, and mechanical engineering Bachelor of Science degree programs by the Accreditation Board for Engineering and Technology, the national accrediting agency of the engineering profession. The Institute of Optics is an internationally known center for teaching and research.

The Eastman School of Music, known throughout the world as a major center for the training of professional musicians as well as for the study and creation of music, offers diverse curricula leading to undergraduate and graduate degrees. Students pursuing a Bachelor of Arts degree through the College of Arts and Science with a concentration in music take some of their coursework at the Eastman School. Other University undergraduates, having met the requirements and with permission, may also take applied music lessons or other music courses at Eastman.

The Margaret Warner Graduate School of Education and Human Development (pages 171 to 173) provides a broad range of courses and programs for undergraduates interested in studying various aspects of education and an extensive teacher education program. Undergraduates can take courses in subjects ranging from psychology of learning and adolescent development, to education in the American social order. Secondary teacher certification is offered in English, mathematics, modern foreign languages, the various sciences, and social studies. The Warner School also offers a 3-2 Program in Human Development, designed for students planning to undertake graduate study. Students begin the program in their senior year and complete the master's degree in a final year of graduate study.

In addition to the programs leading to the M.D., M.S., and Ph.D. degrees, the School of Medicine and Dentistry offers unusual opportunities for undergraduates. In the newly instituted Rochester Early Medical Scholars Program (REMS), exceptionally talented students enter the University with an assurance of admission to the medical school. The Rochester Plan offers sophomores early admission to the School of Medicine and Dentistry with an integrated program of study.

The School of Nursing (pages 159 to 165) offers study leading to the Bachelor of Science degree with a major in nursing. Undergraduate students are admitted to the College of Arts and Science. They may declare nursing as a major and then will be enrolled in a pre-nursing sequence of courses. As juniors, they enter the School of Nursing for professional coursework and clinical experience. Students within the University of Rochester and from other colleges and universities may also transfer into the School of Nursing upon successful completion of specified liberal arts and science courses. Registered nurses interested in completing a baccalaureate degree in nursing are encouraged to enter the B.S. track designed especially for them. The other degrees offered by the School include a combined B.S./M.S. program for registered nurses, Master of Science degree in one of many clinical specialties with a broad range of subspecialties, or the Doctor of Philosophy in nursing. A postdoctoral clinical scholars program and a post-master's program are also available.

The William E. Simon Graduate School of Business Administration (pages 167 to 170) offers graduate study in business administration for management careers in the profit and nonprofit sectors. For undergraduates interested in such careers, it also offers a unique opportunity to earn an undergraduate degree and a Master of Business Administration degree (M.B.A.) in five years instead of the usual six. This 3-2 program consists of three years of undergraduate study in another college followed by two years in the Simon School. The School also offers undergraduate courses in management in the areas of accounting, behavioral science in industry, computers and information systems, finance, general business administration, law, marketing, and operations management. The School
cooperates in an undergraduate program leading to a Certificate in Management Studies, offered by the College of Arts and Science (see page 95).

THE RIVER CAMPUS

The 60-year-old River Campus is the University's main campus and "home ground" for most of its undergraduates; it is the location of the College of Arts and Science and the College of Engineering and Applied Science, as well as the Margaret Warner Graduate School of Education and Human Development and the William E. Simon Graduate School of Business Administration. On the southern edge of the city, the 90-acre campus is tucked in a bend of the Genesee River. Next door are the University Medical Center and one of Rochester's many parks.

The original complex of buildings on the campus in the Greek Revival and Georgian Colonial styles has been expanded with newer structures designed to harmonize with their older neighbors. Newer buildings include the Wilson Commons, a six-level glass-and-brick student union designed by the renowned architect I. M. Pei; the multipurpose Zornow Sports Center, housing the University's programs in sports and recreation and used by over 90 percent of Rochester's undergraduates; the Computer Studies Building, home of several academic departments as well as a science library and student computer facilities; and Schlegel Hall, home of the Simon School.

The scale and the greenery of the River Campus are mirrored by the livable size and quality of the City of Rochester. A center of mature and emerging high technology firms, Rochester is an hour from New York City and 20 minutes from Toronto by plane, and an hour's drive north of New York's Finger Lakes region.

LIFE ON CAMPUS

"The shortest distance between two points is where Wilson Commons is." This campus graffiti, chalked up during construction of the student union, accurately identifies the hub of out-of-class life.

Wilson Commons is the kind of place where you meet friends, eat lunch, watch television, see a film, view an art exhibit, give a concert, have a party, play ping-pong, consume a piece of the famous mouth-watering Wilson Commons fudge, or just watch the passing throng—all recognized and respected student activities.

A great deal goes on inside Wilson Commons—and elsewhere on the campus. "Your social life is what you make it," says one Rochester student. "There's a lot of discovering to be done. You can always find your own niche."

Niches found by one freshman by the end of her first semester, for example, were a volunteer job at nearby Monroe Community Hospital, yoga classes at the University Interfaith Chapel, a lively dance group at the Commons, and ice-skating sessions.

Other undergraduates work on the student-run campus newspaper or the AM-FM radio station, join one or more of the many performing arts groups, participate in the activities of political action and community service organizations, or collaborate with like-minded students in a variety of special-interest groups, from the Sailing Club to the Science Fiction Society.

In all, students pursue a variety of individual interests through more than 90 campus groups, and student-sponsored events take place nearly every night of the week: film series, both classic and contemporary; concerts, recitals, and plays; a lively outside-speakers program; and parties and informal get-togethers. (For a more detailed description of these activities, see the Student Affairs section beginning on page 187.)

Special campus-wide events enliven the school year at regular intervals: Yellow-jacket Day to start things off in the fall, Dandelion Day to celebrate the arrival of spring, and a variety of festivals and frolics to enliven the months in between.

SPORTS AND RECREATION

Rochester joins eight other leading private universities around the nation (Brandeis, Carnegie Mellon, Case Western Reserve, University of Chicago, Emory University, Johns Hopkins, New York University, and Washington University) in the University Athletic Association; the members of this league engage in round-robin and championship competition in most of their varsity sports.

The 19 varsity teams (10 men, 9 women) are complemented by an extensive schedule of intramural sports—from racquetball, basketball, and volleyball to inner-tube water polo and tennis, and club sports such as crew, ice hockey, and men's and women's lacrosse. About one-half of the undergraduate students participate in the intramural program, which includes men's, women's, and coed competition. On occasion, faculty and staff members also join in. (See Sports and Recreation, page 195.)

The Rochester Crew is host to an array of college rowing teams for the annual...
Bausch & Lomb Invitational Regatta, a fall event on the Genesee River enjoyed by the campus and Greater Rochester communities.

There is also ample opportunity for individual recreation. The University maintains a jogging path along the Genesee River, a 400-meter outdoor track, a banked eighth-mile indoor track, and comprehensive aerobic and Nautilus exercise and weight-training facilities. Swimming facilities accommodate both serious lap-swimmers and those who just want to swim to relax. An enclosed ice rink adjacent to the campus has special hours for University skaters.

The multipurpose Zornow Sports Center offers recreational facilities for tennis, volleyball, basketball, and swimming.

STUDENT RESIDENCES

"The people on my hall are like my family," says an undergraduate who looks forward to going home to her residence hall after classes and intensive study sessions at the library. Like most undergraduates, she chooses to live in University housing, within minutes of classrooms, labs, libraries, recreational, and athletic facilities.

The living accommodations are comfortable and diverse enough to meet individual preferences. As part of its continuing renovation program, the University has already renovated 12 of the larger residence halls on the River Campus with four more scheduled for renovation by 1996.

All campus residence halls have individual room telephones, most of which are equipped for computer data service, automatic message recording, and other up-to-date telecommunications features. Students may also subscribe to the University discount long-distance services.

The Medieval House, Drama Center, Music Floor, Interclass Living Center, and Computer Interest Floor are among a score of special-interest residence arrangements appealing to many students. Here student residents and faculty members with mutual interests learn from each other in informal settings.

These intellectually centered resident communities sponsor films, concerts, outside speakers, readings, plays, and off-campus ventures open to their entire residential unit, and often to the entire University as well. Special-interest housing is also provided in the residence halls for the "residential" fraternities and sororities; six other fraternities maintain houses on the Fraternity Quadrangle. (See page 189 for more on student residences and the program for students who choose to live off campus.)

THE OTHER UNIVERSITY OF ROCHESTER CAMPUSES

The Medical Center, adjacent to the River Campus and the site of the School of Medicine and Dentistry and the School of Nursing, has extensive facilities providing an excellent spectrum of patient care and research to support the educational programs. Strong Memorial Hospital, with a capacity of 715 beds, is an integral part of the University's Medical Center and serves as the principal teaching hospital of the School of Medicine and Dentistry and the School of Nursing.

The School of Nursing administrative offices, classrooms, conference rooms, and faculty offices are located in Helen Wood Hall. A Teaching/Learning Resource Center designed to promote independent, self-paced learning for nursing and medical students is located in the Medical Center. The amphitheaters, classrooms, conference rooms, and laboratories of the Medical Center and the River Campus are also used for instruction of nursing students.
The Edward G. Miner Library is a full-service library with more than 220,000 volumes, including more than 3,000 current journals and serials, an extensive collection of reference resources in medicine, nursing, and psychiatry, and more than 15,000 volumes in the rare and historical collections.

The Eastman School of Music is linked to the other campuses by University-run free shuttle buses. Its Sibley Music Library, with resources numbering more than a half-million items, is recognized as one of the foremost music research libraries in the world. Housed since 1989 in commodious and newly constructed facilities, its collection includes autograph scores of masters of the past as well as those of many contemporary composers. Kilbourn Hall (seating capacity, 459), Howard Hanson Recital Hall (65), Kilian and Catoline Schmitt Organ Recital Hall (96), and Eastman Theatre (3,094), one of the great theaters of the Western world, comprise the unparalleled performance facilities of the School.

The University’s South Campus, a quarter-mile south of the Medical Center, was opened in 1966 with the completion of the Nuclear Structure Research Laboratory, which is used by the Departments of Physics and Astronomy, Chemistry, and Geological Sciences. Another building houses the Laboratory for Laser Energetics of the College of Engineering and Applied Science and the National Laser User’s Facility. The Center for Optoelectronics and Imaging, a newer building housing additional research programs, is connected to the Laboratory for Laser Energetics. The River Road Laboratory and Residence are also included in the South Campus. South Campus is linked to other campuses by a free University shuttle bus service.

The Prince Street Campus contains the University’s Memorial Art Gallery, which serves as a public art museum serving west-central New York, with representative collections of world art of nearly all major schools and periods and regularly changing exhibitions.

C.E.K. Mees Observatory is located on Gannett Hill in the Bristol Hills south of Rochester.

THE ROCHESTER AREA

"The Rochester area has a lot to offer, and Rochester students are very mobile," says a senior who adds variety to his out-of-class time by exploring the attractions of the city and its countryside. "If you want to go off campus, it’s easy." Many students have cars; others get rides from friends. A free shuttle bus connects the University campuses, making regular stops at the Eastman School of Music in downtown Rochester. A "UR Special" bus makes weekend runs to a variety of "hot spots," movie theaters, restaurants, and snack places.

Rochester is a culturally sophisticated city south of Lake Ontario and north of the hills of the Finger Lakes region. With a flavor and appeal of its own, it has been rated among the East’s most livable cities: small enough and clean enough to be comfortable, but large and cosmopolitan enough (it’s the third-largest metropolitan area in New York State) to afford a variety of diversions, whether your tastes run to symphony orchestras and jazz concerts, planetariums and museums, or harness racing and professional ice hockey.

For off-campus eating, the city offers a tempting array of restaurants, from elegant, expensive, and continental, to tasty, economical, and ethnic. Many of the favorite restaurants are located in the Park Avenue area, a section filled with comfortable turn-of-the-century residences, boutiques, handcraft shops, art galleries, import stores, and emporia (for instance, a celebrated neighborhood shop that sells everything from gourmet jelly beans and upscale doodads to specialty coffees and outrageous greeting cards).

Adjacent to Park Avenue is stately, tree-lined East Avenue, once dubbed the most beautiful residential street in America. Two of the Rochester area’s many museums are located here—the world-famous International Museum of Photography at George Eastman House and the Rochester Museum and Science Center, which includes the Strasenburgh Planetarium, one of the most sophisticated planetariums in the world. Nearby is the University’s Memorial Art Gallery, possessing a distinguished collection of world art and with regularly changing loan exhibitions. The newer Margaret Woodbury Strong Museum focuses on the growth of American taste from the Victorian era through 1930 and includes among its holdings of fine and decorative arts the world’s largest and most definitive doll collection. The area’s other major museum, the Genesee Country Museum, a reconstructed nineteenth-century village, is located in farm country several miles southwest of the city.
Rochester has been called “a city of music.” The presence of the University's Eastman School of Music, one of the world's great comprehensive music schools, and the Rochester Philharmonic Orchestra, one of the country's fine regional orchestras, has nurtured a proliferation of other performing organizations, among them the Rochester Bach Festival, the GeVa professional theater company, and the world-touring Bucket Dance Theatre. The accomplished artists who study and teach at the Eastman School are featured in concerts, most of them free, almost every night of the week. In addition, the School's beautiful Eastman Theatre regularly plays host to distinguished guest performers. Visiting artists include such names as James Galway, Itzhak Perlman, Jean-Pierre Rampal, Mstislav Rostropovich, Isaac Stern, the New York City Ballet, and the American Ballet Theater. Jazz and popular-music concerts are a frequent feature of the local concert schedule.

Professional baseball and ice hockey are popular spectator sports in Rochester, with major-league football and hockey just an hour's drive away in Buffalo. Horses race at nearby Finger Lakes Race Track and Batavia Downs.

In the city and beyond is a network of public parks for recreation of all kinds, including canoeing, hiking, horseback riding, skiing, fishing, and swimming. Genesee Valley Park, next door to the campus, offers athletic fields and courts, boating, ice skating, and picnicking, and has two public golf courses. About an hour's drive away are Letchworth Park, the "Grand Canyon of the East," and the Finger Lakes, home of the New York State wine industry and the site of a variety of recreational opportunities, including 17 ski areas. Niagara Falls and Toronto, one of the continent's most exciting cities, are not far away by car.

A major center for medical and social services, the community offers many opportunities for volunteer service. For example, several University of Rochester varsity basketball players started an informal Saturday morning coaching clinic for youngsters who go to the elementary school in a neighborhood across the river from the campus. Students deciding to volunteer also may work in hospitals, including the University's Strong Memorial Hospital, courts, prisons, social service organizations, and educational and tutorial agencies.

Skiers, ice skaters, snowmobilers, ice boaters, snowshoers, sledders, tobogganers, ice fishermen, builders of snowmen, and makers of snow angels love Rochester's winters. Spring and fall in Rochester are beautiful, and the University's location affords a good opportunity to enjoy them. While it is a major metropolitan center, the City of Rochester is minutes from open countryside.
Degrees Offered

Degrees are awarded by the University of Rochester in the following subjects, grouped by college or school of the University:

**COLLEGE OF ARTS AND SCIENCE**

Anthropology (B.A., M.A., Ph.D.)
Applied Mathematics (B.S., M.S.)
Art and Art History:
  - Art History (B.A.)
  - Studio Arts (B.A.)
Astronomy (Ph.D.)
Biological Sciences (B.S.), with specialties in:
  - Biochemistry
  - Cell and Developmental Biology
  - Ecology and Evolutionary Biology
  - Microbiology
  - Molecular Genetics
  - Neuroscience
Biology (B.A., M.S., Ph.D.)
Biology-Geology (B.S., M.S.)
Chemistry (B.A., B.S., M.S., Ph.D.)
Cognitive Science (B.A.)
Computer Science (M.S., Ph.D.)
Computer Sciences: Applied Mathematics (B.S.)
Computer Sciences: Mathematics (B.A.)
Economics (B.A., M.A., Ph.D.)
English (B.A., M.A., Ph.D.)
Environmental Studies (B.A.)
Environmental Science (B.S.)
Film Studies (B.A.)

Foreign Languages, Literatures, and Linguistics:
  - Comparative Literature (M.A., Ph.D.)
  - Foreign Literature (B.A., M.A.)
  - French (B.A., M.A.)
  - German (B.A., M.A.)
  - Japanese (B.A.)
  - Linguistics (B.A., M.A., Ph.D.)
  - Russian (B.A.)
  - Spanish (B.A., M.A.)
Geological Sciences (B.A., B.S., M.S., Ph.D.)
Geomechanics (B.S.)
Health and Society (B.A.)
History (B.A., M.A., Ph.D.)
Interdepartmental Studies (B.A., M.A., M.S.)
Mathematics (B.A., M.A., M.S., Ph.D.)
Mathematics-Statistics (B.A., M.A.)
Medical Statistics (M.S.)
Music (B.A.)
Philosophy (B.A., M.A., Ph.D.)
Physics (B.A., B.S., M.A., M.S., Ph.D.)
Physics and Astronomy (B.A., B.S., Ph.D.)
Political Science (B.A., M.A., Ph.D.)
Psychology (B.A., M.A., Ph.D.)
Public Policy Analysis (M.S.)
Religion and Classics
  - Classics (B.A., M.A.)
  - Religion (B.A.)
Statistics (B.A., M.A., Ph.D.)
Visual and Cultural Studies (M.A., Ph.D.)
Women's Studies (B.A.)

Certificate Programs in the College of Arts and Science (taken in conjunction with a bachelor's degree)
  - Actuarial Studies
  - Asian Studies
  - Biotechnology
  - International Relations
  - Management Studies
  - Russian Studies

**Minors in the College of Arts and Science** (taken in conjunction with a bachelor's degree)
  - Anthropology
  - Applied Economics
  - Archaeology
  - Art History
  - Astronomy
  - Biology
  - Chemistry
  - Classical Civilization
  - Classics: Greek
  - Classics: Latin
  - Comparative Literature and Theory
  - Economic Theory
  - English Literature
  - Environmental Geology
  - Ethics
  - Film Studies
  - French
  - Geological Sciences
  - German
  - Health and Society
  - Health Psychology
  - History
  - History of Philosophy
IItalian
Japanese
Latin American Studies
Linguistics
Literary Theory
Marine Geology and Ecology
Medical Anthropology
Music
Organizational Psychology
Paleontology and Evolution
Philosophy
Philosophy of Science
Physics
Political Science
Probabilistic Mathematics
Psychology
Psychology as a Natural Science
Psychology as a Social Science
Religion
Russian
Spanish
Statistics
Studio Arts
Theater
Women’s Studies
Writing

COLLEGE OF ENGINEERING
AND APPLIED SCIENCE
Chemical Engineering (B.S., M.S., Ph.D.)
Electrical Engineering (B.S., M.S., Ph.D.)
Engineering and Applied Science, an Interdepartmental Program (B.S.)
Engineering Science (B.A.)
Geomechanics (B.S.)
Materials Science (M.S., Ph.D.)
Mechanical and Aerospace Sciences (M.S., Ph.D.)
Mechanical Engineering (B.S.)
Optics (B.S., M.S., Ph.D.)
Certificate Programs in the College of Engineering and Applied Science (taken in conjunction with a bachelor’s degree)
Biomedical Engineering
Minors in the College of Engineering and Applied Science (taken in conjunction with a bachelor of science degree)
Chemical Engineering
Electrical Engineering
Mechanical Engineering

EASTMAN SCHOOL OF MUSIC
Applied Music (B.M.)
Conducting (M.M., D.M.A.)
Jazz Studies and Contemporary Media (M.M.)
Music Composition (B.M., M.A., M.M., D.M.A., Ph.D.)
Music Theory (B.M., M.A., Ph.D.)
Musicology (M.A., Ph.D.)
Opera (M.M.)
Performance and Literature (M.M., D.M.A.)
Piano Accompanying and Chamber Music (M.M., D.M.A.)

SCHOOL OF MEDICINE
AND DENTISTRY
Anatomy (M.S., Ph.D.)
Biochemistry (M.S., Ph.D.)
Biophysics (M.S., Ph.D.)
Dental Science (M.S.)
Environmental Studies (M.S.)
Genetics (Ph.D.)
COLLEGE OF ARTS AND SCIENCE
COLLEGE OF ENGINEERING AND APPLIED SCIENCE
EASTMAN SCHOOL OF MUSIC
SCHOOL OF MEDICINE AND DENTISTRY
SCHOOL OF NURSING
WILLIAM E. SIMON GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
MARGARET WARNER GRADUATE SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT

OFFICIAL BULLETIN
UNDERGRADUATE STUDIES
1993–95

(Separate bulletins also are published for graduate studies and by the Eastman School of Music, School of Medicine and Dentistry, William E. Simon Graduate School of Business Administration, and Margaret Warner Graduate School of Education and Human Development.)
In 1900, suffragist Susan B. Anthony pledged her $2,000 life-insurance policy to assure that women were admitted to the University, then a college for men only.

Industrial Hygiene (M.S.)
Medicine (M.D.)
Microbiology (M.S., Ph.D.)
Neuroscience (M.S., Ph.D.)
Pathology (M.S., Ph.D.)
Pharmacology (M.S., Ph.D.)
Physiology (M.S., Ph.D.)
Public Health (M.P.H.)
Toxicology (M.S., Ph.D.)

SCHOOL OF NURSING
Nursing (B.S., M.S.), Combined B.S./M.S. for R.N.s, Ph.D., Combined M.S./M.B.A., Post-Masters study to prepare practitioners
Clinical specialty areas of study for M.S. include:
- Care of Children and Families
- Community Health Nursing
- Gerontological Nursing
- Medical-Surgical Nursing
- Nursing Administration
- Primary Care Nursing
  • Adult
  • Family
- Psychiatric-Mental Health Nursing
- Women’s Health Care
- Master of Science in Nursing/Master of Business Administration

WILLIAM E. SIMON
GRADUATE SCHOOL OF BUSINESS ADMINISTRATION
Business Administration (M.S., M.B.A., Ph.D., Combined M.B.A./M.S. in nursing, M.B.A./M.S. in microbiology, M.B.A./M.P.H., M.B.A./Master’s in engineering [Keio University, Japan])

MARGARET WARNER GRADUATE SCHOOL OF EDUCATION AND HUMAN DEVELOPMENT
Education (M.S., Ed.D., Ph.D.): Administration, Teaching and Curriculum, Counseling and Human Development, Higher Education
Elementary Teacher Education (M.S.)
Teacher Education (M.S., M.A.T.)

Certificate Programs (taken in conjunction with a bachelor’s degree) leading to a New York State teaching certificate
Secondary Education for one of the following areas:
- English
- Mathematics
- Modern Foreign Languages
- Science (Biology, Chemistry, Physics)
- Social Studies

3-2 Program (leading to the M.S.): Human Development

UNIVERSITY COLLEGE OF LIBERAL AND APPLIED STUDIES
General Studies (B.S.)* with concentrations in:
- Humanities
- Natural Sciences
- Social Sciences

UNIVERSITY-WIDE STUDIES
Combined Bachelor’s Programs
B.A. and B.S. in the College of Arts and Science
B.A. or B.S. in the College of Arts and Science and B.A. or B.S. in the College of Engineering and Applied Science
B.A. or B.S. in the College of Arts and Science and B.M. in music
B.A. or B.S. in the College of Arts and Science and B.S. in nursing

3-2 Programs
B.A. and B.S. in an engineering concentration (for transfer students), see page 136
B.A. or B.S. plus an M.B.A., see page 167
B.A. or B.S. plus a master’s in public health, see page 122
B.A. or B.S. plus an M.S. in computer science, see page 61
B.A. or B.S. plus an M.S. in human development or elementary teacher education, see page 171
B.A. or B.S. plus an M.S. in public policy, see page 124
B.A. in statistics plus an M.S. in medical statistics, see page 130
B.S. and M.S. in applied mathematics
B.S. and M.S. in electrical engineering, see page 142
B.S. and M.S. in nursing, see page 164
B.S. and M.S. in optics, see page 152

Combined Bachelor’s and M.D. Degree Program
B.A. or B.S. plus an M.D.

Combined Master’s Programs
Master of Public Health and M.S. in public policy, see page 124
M.B.A. and Master of Public Health
M.B.A. and M.S. in microbiology and immunology
M.B.A. and M.S. in nursing

Inter-College Degree Programs
**Genetics (Ph.D.)
Neuroscience (M.S., Ph.D.)

* These degree programs are not open to matriculants after July 1, 1983
** NYS approval pending.
LIBRARIES
The University library system houses more than two and a half million volumes and subscribes to about 12,000 current periodicals and other serial publications. River Campus libraries include Rush Rhees (humanities and social sciences), Carlson (sciences and engineering), and the Physics-Optics-Astronomy Library. Beyond River Campus are Edward G. Miner Library in the Medical Center, Sibley Music Library at the Eastman School of Music, Charlotte Whitney Allen Library at the Memorial Art Gallery, and the library at the Laboratory for Laser Energetics.

LIBRARY SERVICES
Library staff throughout the system offer a wide range of services to support coursework, research, and teaching. Reference staff in each library are available weekdays and evenings (and some reference help is available on weekends) to help students launch research assignments or find an elusive fact, statistic, address, or other detail. Most reference librarians at the University have a second academic subject specialty besides library science, so students can seek an appropriate expert for difficult research problems in a particular field. These subject specialists also choose the best current books and journals needed for courses and research. In addition, librarians teach basic and advanced research techniques, through classroom presentations, library tours, and database search training sessions. More than 90 databases, indexing materials in the sciences, arts, humanities, engineering, and social sciences are available in compact disk (CD-ROM) format for free do-it-yourself searching on microcomputers. Hundreds of other databases (many providing the full text of sources) can be searched by librarians for a small fee. Students who want to do their own remote database searching can obtain training through the libraries.

Chester, the on-line catalog for the University libraries, is a popular successor to the card catalog. Multiple Chester terminals are available at all the libraries; students also can reach Chester from locations all over campus, including residence halls. Besides showing what the libraries own, Chester indicates whether an item is checked out and when it's due back. Automation also streamlines the checkout process; borrowers need only present a validated University ID. Undergraduates may borrow library materials for four weeks.

Hours vary among the libraries, but late-night study hours are available at several locations. Together River Campus libraries provide about 2,600 seating spaces, with remote single carrels for quiet concentration, large tables convenient for group projects, and comfortably upholstered settings for rest and leisure reading. Abundant photocopiers, microcomputers and software are available in convenient locations.

A variety of networks, including the Center for Research Libraries, the Research Libraries Group, OCLC (Online Computer Library Center), and the Internet, permit fast, easy borrowing of materials from other libraries across the country and around the world.

INDIVIDUAL LIBRARIES
Rush Rhees Library is the principal library on the River Campus. It holds about two million volumes, primarily in the humanities and social sciences. There are approximately 40,000 volumes in Rush Rhees’ central reference collection and more than 700,000 volumes in its government documents collection, a federal document depository center. The microfilm collection of more than three million items contains materials which are scarce, unique, or virtually unavailable in the original. Included within Rush Rhees are an Art Library, the Asia Library, a Map Center, and a Management Library. In 1988 another special facility opened in Rush Rhees, housing the Robbins Library and the Koller-Collins Graduate English Center. Robbins Library is a collection on medieval literature and life, donated by the late Rossell Hope Robbins, Middle English literature specialist. The Koller-Collins Center is a core collection in British and American literature.

Also housed in Rush Rhees is the Department of Rare Books and Special Collections. Special strengths in its 90,000-volume book collection include English drama (particularly John Dryden and Samuel Foote); works of Robert Southey, Alfred Tennyson, Mark Twain, Henry James, Sean O’Casey, and many others;
seventeenth-century English theology and politics;
1,300 books and pamphlets relating to Leonardo da Vinci;
history of law and political theory;
local history and other specialties.

Among the Department’s more than 300 manuscript collections and several thousand single items (such as letters, diaries, and account books) are:
the papers of literary figures, including John Gardner, Colin MacInnes, Jette Mangione, and John A. Williams;
papers of the Federal Writers Project;
papers of American political figures, such as William Henry Seward, Susan B. Anthony, Frederick Douglass, and Thomas E. Dewey;
papers of anthropologist Lewis Henry Morgan;
papers and drawings of architect Claude Bragdon.

This department also houses the University archives: printed and manuscript material relating to the history of the University.

The Computing Library and Resources Center (CLARC) in Rush Rhees is jointly operated by the Library and the University Computing Center. Hundreds of software titles are available for use on CLARC’s abundant microcomputers. Computer consultants staff CLARC’s main desk to help with hardware or software questions. The CLARC collection contains not only software and user manuals, but also computing books and journals.

Science and Engineering Libraries:
Libraries with special collections in science and engineering include Carlson Library (Computer Studies Building), Physics-Optics-Astronomy Library (Bausch & Lomb Hall), the Laboratory for Laser Energetics Library (South Campus), and the Map Center (Rush Rhees).

 Carlson Library (named for Chester Carlson, inventor of xerography) specializes in the information needs of students and faculty in biology, chemistry, computer science, engineering, geology, mathematics, and statistics. Opened in 1987, this facility provides a comfortable and pleasant atmosphere for study. Carlson Library contains about 132,000 volumes and maintains subscriptions to almost 2,000 journals. Photocopying, microfiche and microfilm readers, microcomputers, and CD-ROM database workstations are readily accessible. Carlson Library appeals to many because it is open long hours for late-night studying.

The Physics-Optics-Astronomy Library houses 27,000 volumes and 350 journal subscriptions, plus a large collection of preprints in particle physics, and patents in lens design. The Laboratory for Laser Energetics Library serves the research information needs of scientists and undergraduates working at this major government-funded research laboratory.

The Map Center offers collections of geologic maps, U.S. topographic maps, and political and historical maps.

The University libraries—through cooperative activities with other libraries in the Rochester community and throughout the nation and the world—are links in a vast information network. They offer tremendous resources in support of study and research, thereby providing a significant component in the educational experience at the University of Rochester.

THE ARTS

In addition to the superb theaters of the Eastman School, the University has several excellent facilities for the performing arts on the River Campus. Strong Auditorium, the largest hall on campus, is the scene of many music performances, lectures, films, and other activities. More intimate spaces for concerts are available in the Wilson Commons Student Center, in the Welles-Brown Room, located in Rush Rhees Library, in the Interfaith Chapel, and in Hubbell Auditorium, located in Hutchison Hall. Music practice facilities are located in the Frederick Douglass and Spurrier buildings. Seventeen rooms are equipped with pianos and are available to all students for 15 hours each day. Most residence halls also have practice facilities available.

For drama, Todd Theater and the Drama Center are favorite spots. Todd Theater, which seats approximately 160 persons, is home to student performers as well as to professional guests, who in recent years have included Edward Albee and members of the Royal Shakespeare Company. Drama Center offers a residential base for about 20 students—and a chamber theater for their productions as well. Student groups that use the various drama facilities include the Committee on the Performing Arts and the Association for Black Drama and the Arts. For dance, the Spurrier Dance Studio offers a fine resource for classes and performances and for presentations by distinguished dance companies.

The visual arts are served by several centers. On the River Campus, Sage Art Center provides a spacious area where student and faculty artists can pursue their work, while the Hartnett Gallery, in Wilson Commons, offers a site for frequently changing exhibits of student and professional art. Off-campus, the University’s Memorial Art Gallery offers students the opportunity to see examples of works from periods they may be studying and by such masters as Rembrandt, Cezanne, Monet, and Henry Moore. For students interested in photography, outstanding exhibits are avail-
able in the International Museum of Photography, located at the George Eastman House. For those who want to study film, the museum offers rich resources. Significant film holdings, which can be viewed by individual students as well as by groups, are also available in the Film Studies Center on the River Campus.

COMPUTERS AT ROCHESTER
The University's approach to computers mirrors the approach taken in the professional world.

In some areas of business and industry, computers are tools for record keeping, data processing, and systems analysis. In other areas, computers are themselves the objects of research and development.

So it is at Rochester, where students and professors employ computers selectively to study everything from writing to optics, and where, at one of the country's top computer science departments, innovative researchers take on projects like the development of a new generation of supercomputers.

The University has several mainframe computers for academic use, running the UNIX, VMS, VM/CMS, and MVS operating systems. Dozens of public terminals and all residence hall rooms are connected to these mainframes and to the public telephone network through the data communication ports of the University's digital telephone system.

Nearly 300 workstations and microcomputers in open computing laboratories are available to undergraduates. Many of these are connected to the campus-wide Local Area Network, giving high-speed access to the University's mainframes and to the national research networks.

Several departmental computing laboratories and networks supplement these facilities with discipline-specific computers and software.

In addition, the University has a Silicon Graphics multiprocessor and undergraduate students have the opportunity to assist faculty in advanced research in parallel computation.

All of these facilities are readily accessible to students, whether they are running complex statistical analyses, designing integrated circuits, or just beginning to learn about computer languages.

The College of Arts and Science operates a College Writing Center that is open to all students. It supports the College's emphasis on undergraduate writing instruction by providing collaborative writing and word-processing facilities, and access to staff skilled both in the teaching of English composition and in the use of computers.

Through a computer account at the University Computing Center, all faculty, staff, and students can participate in NYSERNET, a link between universities and industries throughout New York and to supercomputing centers at Cornell and four other centers nationwide. Access to this network, which connects directly to transcontinental links, is shared by industries, medical centers, and research facilities. Researchers using the network have access to vast amounts of data. Network members also are able to exchange information with each other and to take full advantage of electronic mail, supercomputer calculations, tele-conferencing, library research, and remote education.
Faculty in the computer science department are in the forefront of research in many aspects of the field, including artificial intelligence. A number of University departments use computers in presenting course materials, and programs in mathematics, engineering, management, and education all offer opportunities for computer concentration (see relevant department listings). Each semester over half of Rochester's full-time undergraduates are enrolled in these courses.

Like most of the nation's leading universities, Rochester does not require its students to buy computers. Instead, students are given a broad range of experience with various mainframes, workstations, and microcomputers and are provided the opportunity to purchase computers with professional assistance in selection of systems. The University has negotiated special agreements with several leading computer manufacturers to enable students to purchase computers from an on-campus computer store at significantly discounted prices.

COMPUTING FACILITIES
The University Computing Center, which maintains a library of computer programs to perform many general calculations and analyses, has a staff of analysts and programmers to assist with computing problems. The Center also presents over 40 short courses and tutorials on services. Equipment includes an IBM 4381, a Sun 4/260, a Solbourne and other Suns, a VAX 8650, six VAX 3100s, and over 275 microcomputers. Several on-line timesharing systems are available. These systems can be used through more than 2,500 terminal connections located throughout the campus. The Graphics Lab houses several Sun computers (i.e., 4/260, 3/260, three 3/60s, and a 3/160) and two color printers and a 35mm film recorder.

The University maintains microcomputers for open access by students in several locations; there are large microcomputer laboratories in Rush Rhees Library and in Taylor Hall and microcomputer facilities in six residence halls open 24 hours a day to their residents. Rush Rhees Library also has a software collection which is available for evaluation. In addition, individual colleges, e.g., the College of Engineering and Applied Science, provide microcomputer laboratories. The Margaret Warner Graduate School of Education and Human Development and the School of Nursing maintain their own microcomputer laboratories for use by students enrolled in programs or courses offered through the schools. A powerful scientific computer facility exists at the Laboratory for Laser Energetics, where a Cray Y-MP is dedicated to energy research. The William E. Simon Graduate School of Business Administration Computing Center provides interactive computer access based on a Hewlett-Packard HP3000 Series 68 computer. (See page 169 for a more complete description of the Center's services.)
The 37-ton statue presiding over the lower quadrangle honors Martin Brewer Anderson, president of the University from 1853-1888. A large and imposing man, he would rush out of his office to break up fights among exuberant students.

There are many microcomputers, workstations, file servers, and computer services available for student use via University computing networks. For example, the departments of the College of Engineering and Applied Science are interconnected by a broadband network. This network is connected to the University Telecommunications system and enables access by PC, Macintosh, and high performance workstations to a number of college file systems and very high performance computing facilities.

SPECIAL RESEARCH FACILITIES
The University has a broad range of specialized facilities for research:
- An 18 MV tandem Van de Graaff accelerator is the principal research instrument at the Nuclear Structure Research Laboratory.
- Fifteen electron microscopes are available.
- C.E.K. Mees Observatory on Gannett Hill in the Bristol Hills, about 40 miles from Rochester, is the highest observatory in the eastern half of the United States. It has a 24-inch Cassegrain telescope, one of the largest in the state.
- Specialized laboratories and controlled-environment rooms are located in the building housing the psychology department.
- Rochester is one of nine universities responsible for the management of the National Radio Astronomy Observatory and the Brookhaven National Laboratory under federal contracts. It is a leading user and participant in the University Research Association, which manages the world's most powerful device for studying subatomic interactions.
- The Laboratory for Laser Energetics, a multidisciplinary teaching and research unit of the College of Engineering and Applied Science, is the first of its kind at any American college or university. Students are involved in all of the research programs, including a project to explore the potential of high-power lasers to produce controlled thermonuclear fusion as an alternative energy source. The Laboratory's principal research tool is a 12-trillion-watt laser system. This system is currently being upgraded and will be one of the two most powerful lasers in the world by 1995. The research activities include major programs in: photon-matter interactions, optical materials development, laser physics and technology, and the physics of ultra-high density phenomena. The Laboratory also investigates the production and use of phenomena occurring on time scales less than a billionth of a second. LLE contains many specialized facilities including a Cray Research Inc., Cray Y-MP supercomputer with two central processor units, an image processing laboratory, a materials characterization laboratory, an optical coating facility, and other support equipment.
- Specialized laboratories fully equipped for the full range of geological, biological, and chemical testing and analysis are located in the River Campus's Hutchison Hall.

OTHER COLLEGES IN THE ROCHESTER AREA
Colgate Rochester (Colgate Rochester Divinity School-Bexley Hall-Crozer Theological Seminary) is an interdenominational seminary affiliated with the University of Rochester. It offers graduate programs leading to professional degrees related to the ministry. The arrangement between the two autonomous institutions permits students from either to take courses at the other, with approval of faculty advisors. Faculty and students of both institutions have full library privileges on each campus.

There are several other institutions of higher learning in or near the city of Rochester. These include Rochester Institute of Technology, Nazareth College, St. John Fisher College, Monroe Community College, State University Colleges at Brockport and Geneseo, and Roberts Wesleyan College. It is possible for students enrolled at the University of Rochester to complement their programs with courses taken at one of the area colleges. (See Special Academic Opportunities under Academic Services and Information, page 176.)
Special Academic Opportunities for Undergraduates

Students taking their entire four years as undergraduates in the College of Arts and Science receive extraordinarily strong grounding in their chosen fields. But the outstanding graduate and professional schools of the University also offer undergraduates many opportunities to study in advanced and specialized areas (some are briefly mentioned in the listing of the colleges and schools earlier in this book). With only a few exceptions, students may count credits for courses in any unit of the University toward the bachelor's degree in the College of Arts and Science.

Graduate study in one's specialty may be taken for credit toward the bachelor's degree by students whose work in a given area is sufficiently advanced.

3-2 Programs

Five-year combined programs of undergraduate and graduate study (the first three undergraduate, the last two graduate) are available in a number of fields, and permit students to earn a bachelor's degree (awarded after four years) and a professional master's degree. This 3-2 option is available in fields including:
- Business administration (page 167)
- Computer science (page 61)
- Engineering (page 137)
- Human development (page 171)
- Optics (page 152)
- Public health (page 122)
- Public policy (page 124)

Among other combined programs students can begin during the undergraduate years is the combined Master of Science in public policy/Master of Public Health (page 124).

Here are other options available to Rochester undergraduates:

Senior Scholars Program

The Senior Scholars Program permits selected seniors (approximately 15) to devote their entire final year to a single capstone project that can range from a piece of scholarly research to a work of artistic creativity. Building on the student's career through the junior year, Senior Scholar projects are marked by intellectual engagement and coherence, and by educational soundness and continuity. The projects may include coursework in addition to independent study. They carry up to 32 hours of academic credit and are composed and carried out under the supervision of faculty advisors. Projects must be completed by the end of the senior year.

"Take Five"

The "Take Five" Program permits undergraduates to take a fifth year of study, tuition free, toward the bachelor's degree; students apply after they have been accepted into a major, usually in the sophomore or junior year. The program is designed for students who can demonstrate that they will profit appropriately from an additional semester or year by broadening and enhancing their undergraduate education.

Undergraduate Research

As a major research institution, the University actively encourages primary research by undergraduates, not only in the natural sciences and engineering but in the social sciences and humanities as well. Opportunities for doing hands-on, professionally supervised research in fields as diverse as organic chemistry and medieval history are open to qualified students, both within regular courses and in special independent projects during the regular school year and in summer. As an example of the latter emphasis, Rochester ranks with Harvard and Columbia in the number of its undergraduates who have won coveted National Endowment for the Humanities "Younger Scholar" summer research and writing fellowships. For information on such opportunities, contact the Director of Undergraduate Research, Office of the Dean, College of Arts and Science.

University Day

Wednesday is University Day, and most afternoon classes are suspended in favor of lectures, concerts, and other special events. Activities across campus on a single University Day might include, for example, an exhibit on echocardiography, an open rehearsal by Eastman School students, a film on the history of blacks in America, and lectures on the history of photography, on infrared spectroscopy, and on free trade with China. University Day events are organized and sponsored by both faculty and students.

Certificate Programs

Some students combine their departmental majors with an interdisciplinary...
specialization by following one of the five Certificate Programs—in actuarial studies, Asian studies, international relations, management studies, and Russian studies—offered through the College Center for Academic Support. In addition, a Certificate in Biotechnology is offered through the Undergraduate Program in Biology and Medicine and a Certificate in Bioengineering is offered through the Program in Biomedical Engineering. These certificates, which give formal recognition to the specialized study, are awarded in addition to the bachelor's degree. A student wishing to supplement a major in English with a program in business studies, for example, can earn both a Bachelor of Arts degree with a concentration in English and a Certificate in Management Studies.

PREPARATION FOR THE PROFESSIONS

Business
Companies want more from their employees than skills limited to accounting, marketing, and sales. They look for well-rounded graduates who can think clearly and analytically about business problems, who have a broad perspective on a variety of issues, and who can direct the work of other people effectively. The balance between liberal arts and professional programs at Rochester creates a collegiate environment with a rich mix of intellectual depth and breadth.

The Certificate in Management Studies, as described above, includes formal direction and recognition for the development of business skills, even as students pursue a concentration in the humanities, sciences, or engineering.

The 3-2 program leading to bachelor's and M.B.A. degrees is described elsewhere in this bulletin (page 167).

Education
Through the Margaret Warner Graduate School of Education and Human Development, undergraduates may prepare for careers in secondary school teaching or a variety of human service professions as they complete their bachelor's degree programs. The preservice programs in education and human development also prepare students for graduate study in these fields.

Students who wish to prepare to teach a secondary school subject begin professional study in their junior year. Those interested in human development (research in psychological development or school counseling) may enter the School's 3-2 program as seniors, and complete both bachelor's and master's degrees in a total of five years.

In addition to degree and certification programs, undergraduates may take many courses as electives. Included among them are offerings related to child, adolescent, and adult development; aging; exceptional children; and the social, philosophical, and psychological foundations of education.

For more information about degree and certification programs in the Warner School and about courses open to undergraduates, see page 171.

Engineering
Engineering study at Rochester is not exclusively preparation for an engineering career. In a technological era students also find that engineering is good preparation for careers in business, education, law, and medicine. The less specialized B.A. (engineering science) is well suited to these career goals.

For more information about the College of Engineering and Applied Science, please see page 135.

Government
The University offers a number of interdisciplinary programs designed to help prepare students for a career in government.

Students interested in international affairs may earn a certificate in international relations (see page 93). The Department of Political Science offers undergraduate and graduate courses in public policy and admits a select number of undergraduates into the Public Policy Analysis Program at the end of their junior year (see page 123).

Internship opportunities at the local, state, and national level, and in Europe, are available to undergraduate students.

The Health Professions
For careers in medicine, nursing, dentistry, health care administration, health policy and planning, or the health sciences, students will find a broad curriculum, a comprehensive advising program (page 184), and many ways to gain practical experience at the University.

The unusual health and society concentration is the product of extensive cooperation between the College of Arts and Science and the School of Medicine's Department of Community and Preventive Medicine. This individualized, interdisciplinary degree is suitable for students preparing for medical school, for those seeking a career in health care administration, and for many others who want a broad-based, up-to-date liberal arts education. Students in this program design their own concentration, in consultation with faculty advisors.

Extensive resources for students interested in health-related careers are also available through the College of Engineering and Applied Science. Many stu-
The Frederick Douglass Building was named to honor the legendary black abolitionist who lived and worked in Rochester from 1847 to 1872.

Dents find that an undergraduate degree in engineering provides excellent preparation for medical school. Others use the resources of the College to pursue biomedical engineering (page 154).

Although most medical schools have core-course admissions requirements, it is by no means necessary for applicants to have completed a concentration in biology or another natural science. A student does not need to follow a "premed" or "predent" (or any other preprofessional) concentration program. Students are encouraged instead to become familiar with a broad spectrum of disciplines and to major in what they like and do best.

For premed students who choose biological science, the University offers the Undergraduate Program in Biology and Medicine (page 46). Developed by the College of Arts and Science and the School of Medicine and Dentistry, the program offers seven undergraduate specializations in biological science, a certificate in biotechnology, and numerous opportunities for independent research. Inquiries should be directed to the Undergraduate Program in Biology and Medicine office located in 402 Hutchison Hall.

Outstanding entering students may apply to the new Rochester Early Medical Scholars Program (REMS), an eight-year B.A./B.S.-M.D. program. Students enrolled in this program enter the University as freshmen with an assurance of admission to the medical school pending successful completion of all undergraduate degree requirements and maintenance of the grade standards established by the REMS committee. The program’s most distinctive aspect is its flexibility. REMS students are encouraged to pursue their own special interests; clinical and laboratory opportunities are available, but there are additional options for REMS students that may not relate directly to medicine.

Another opportunity for Rochester undergraduates is the Rochester Plan Early Selection Program, through which students may be accepted to the medical school at the end of the sophomore year. Although the normal eight-year time sequence needed to earn bachelor's and medical degrees is not shortened, the program affords students considerable flexibility and freedom to design personalized and innovative courses of study. Students apply in the sophomore year, and those selected may also pursue double majors or degrees, graduate degrees, and independent research, and may study abroad for longer periods than would otherwise be possible. Finally, those Rochester Plan applicants who successfully complete the first stage of the application process are strongly encouraged to apply simultaneously for the "Take Five" Program (page 23). If accepted, they then have the opportunity to spend a tuition-free ninth undergraduate semester or fifth undergraduate year taking courses unrelated to medicine and their major fields of study. Further information is available from the health professions advisor (College Center for Academic Support, Lattimore Hall).

The School of Nursing offers a distinctive "unified" model of enriched professional education combining nursing research, clinical practice, and teaching. Nursing educators, researchers, advanced clinical practitioners, and administrators are faculty who work collaboratively at the Medical Center and in a variety of community agencies.

Students interested in nursing follow a curriculum of professional study that is based on a strong foundation in the liberal arts and sciences. Upperclassmen build on the broad conceptual foundations established through their previous studies in specified courses in the liberal arts and sciences. Knowledge gained in the humanities, as well as the physical, biological, and social sciences, complements the specific theoretical and clinical instruction in nursing. Special opportunities for students to earn double degrees in nursing and in a College of Arts and Science discipline, such as psychology, are also available. Alternatively, students may complete a minor in a related discipline. Registered nurses are encouraged to pursue a baccalaureate degree in the curriculum plan designed to meet their individual needs in combination with the professional program of study.

A combined baccalaureate and master's curriculum is available to registered nurses who originally received a diploma or associate degree. This accelerated program is designed for highly motivated and career-oriented nurses, currently in clinical practice and interested in earning a baccalaureate degree as well as a master’s degree in a clinical specialty.

Law

Whatever major a prelaw student chooses, law schools will be interested primarily in the breadth and depth of the intellectual challenges represented by the student’s overall undergraduate career. The Association of American Law Schools also stresses the importance of gaining some familiarity with the legal
professions before deciding to apply to law school. Such exposure may be valuable to the admission committee of a law school; even more important, it will assist students in making a wise career choice.

At Rochester, students can have direct personal contact with lawyers through a variety of extracurricular programs, and, in addition, the University offers academic opportunities, including internships locally and abroad, for students to gain first-hand experience with lawyers and their activities.

**Reserve Officer Training Corps**

Rochester has an exceptionally strong Naval Reserve Officers Training Corps (NROTC) program, for men and women students seeking commissions in the U.S. Navy or U.S. Marine Corps (see page 105). In addition, students at the University may take training for either the Army or Air Force Reserve Officer Training Corps through the Rochester Institute of Technology.

**INDEPENDENT STUDY, INTERNSHIPS, AND STUDY ABROAD**

Independent study courses permit qualified students to pursue areas of reading and research not included or not treated in sufficient depth in regularly offered courses. These special tutorial courses are most often on a one-to-one basis, with the content and objectives of the course determined by faculty-student collaboration.

**Practica** are credit courses supervised by University faculty members which usually combine field experience with lectures, seminars, and oral and written reports.

Each practicum provides direct personal interaction with working professionals in their everyday environment. Examples include the interdisciplinary Health Service Practicum, the Practicum in Gerontology, and several courses in the Department of Psychology.

**Internships** enable students to work in a variety of off-campus settings. Recent internship placements have included the Rochester District Attorney’s office, Xerox Corporation, the local television stations, environmental field work for the county, the Memorial Art Gallery, various financial and investment offices, and other local banks and businesses. In social services internships, students worked with the homeless, Vietnamese refugees, and teenage mothers. With special approval, students may engage in full-time internships away from the Rochester area; recent examples include the Heritage Foundation and individually designed internship experiences in Washington, D.C. Opportunities for internships in Washington and abroad are described in the sections that follow. Students in the College of Arts and Science, working under the supervision of a faculty member, can receive credit for their work.

The **Washington Semester Program**, administered by the Department of Political Science, allows selected students to participate on a full-time basis directly in the work of legislators at the national level. Students work as staff assistants in the offices of United States Senators or Representatives for a semester and receive full academic credit. Their activities usually include writing speeches, attending hearings, researching law, taking notes at committee meetings, answering mail, and performing other assignments associated with the political process.

**Study Abroad Programs** provide students with the opportunity to participate in a year or a semester of foreign study sponsored by the University of Rochester or by other American colleges or universities. Rochester-sponsored programs include the one-year program at Worcester College, Oxford University, the programs at Hebrew University in Jerusalem and American University in Cairo, and many one-semester programs in London, Bonn, Brussels, Madrid, and Paris listed below, each of which combines course work with an internship. Students at Rochester and elsewhere are eager to gain first-hand knowledge of the political, social, and economic systems of a rapidly changing Europe. Rochester’s **Internships in Europe Program** provides particularly effective opportunities for learning.

The **London Internship Programs** place students as research and administrative assistants in five different areas: politics, museums, health science/medical research, business, and theater.

**Politics** interns can work for British Members of Parliament and as interns in law firms, interest groups, and constituency offices. Participants must have the opportunity to experience the workings of the British political system at close hand.

**Museum** interns work in a broad range of London museums or art galleries, including the Victoria and Albert, the Museum of the City of London, the Imperial War Museum, the Tower of London, and the Museum of the Moving Image, to name a few. Interns become involved in every phase of museum work, helping select items to be shown, mounting exhibitions, and researching and organizing collections within the museum.

Inscribed with Einstein’s equation of mass and energy, the meridian marker in the center of the Eastman Quadrangle records its exact latitude (43° 7’40") and longitude (77° 37’49”).
Health Sciences Medical Research interns work in the administrative area of a health care facility or in a research laboratory of one of London's leading teaching hospitals, such as Charing Cross, St. George's, or King's College Medical School. The program includes a seminar offering academic exposure to the British health care system through visits to facilities and lecture-discussion sessions with guest speakers.

Business interns are placed according to their specific interests in banks, stock-brokering firms, advertising agencies, and various multinational corporations.

Theater interns are placed in London's "fringe" theaters, which, like New York's "Off-Broadway," are smaller establishments which allow students to get hands-on experience in many different aspects of theatrical productions.

On the Continent, internships are available in Bonn, Brussels, Madrid, and Paris. Each of these four capitals offers unique opportunities to student interns. In Bonn, politics interns are placed with members of the Bundestag; other placements are made in business, museums, and social service agencies. Brussels offers internships with Members of the European Parliament; depending on the student's foreign language skills, they may work for MEPs from any of the 12 European Community member nations. Politics interns in Madrid can work for Members of the Cortes or for political party headquarters; there are also museums, advertising, and business internships. In Paris, students can choose from an extraordinary range of internships in politics, museums, businesses, and theaters.

Through the University's affiliation with the Institute of European and Asian Studies, Rochester students may study in Australia, Austria, China, England, France, Germany, Italy, Japan, Russia, Singapore, Spain, and Taipei. Rochester's affiliation with the Council on International Education Exchange permits students to study in programs in China, Russia, and France.

Rochester is also a member of the Advanced Studies in England Consortium, a program which offers courses in medieval and Renaissance history and literature in Bath, Oxford, and Stratford.

The University of Rochester also sponsors several short courses overseas: the study of French in Rennes, France, and of German in Marburg, Germany; an Italian course in Palermo; and intensive play-going in London are examples of current programs. In the summer of 1992, Rochester began sponsorship of a new CIEE Russian program in Moscow.

SUMMER STUDY
Some students choose to enroll in regular summer session courses or to arrange credit-bearing independent study projects. Some students study abroad on one of Rochester's programs. Summer sessions of varying lengths, offered from May through August, provide students with the option of combining one or two months of coursework with their vacation time.

SPECIAL DEGREE PROGRAMS
The interdepartmental degree programs (pages 93 and 154) provide students with an unusual opportunity to construct individual programs suited to their special talents and interests. Students are currently pursuing interdepartmental concentration programs in culture and communications, American Sign Language and deaf education, computers in media, American studies, biomedical engineering, environmental engineering, and African and African-American studies, among others. Faculty members related to the College Center for Study Abroad and Interdepartmental Programs assist undergraduates in developing their interdepartmental studies concentrations in the College of Arts and Science. Students planning an interdisciplinary program leading to a Bachelor of Science in engineering and applied science or the Bachelor of Arts in engineering sciences work closely with faculty members on the Program Committee in the College of Engineering and Applied Science (page 154).

Two formalized special degree programs are health and society and the cognitive science concentrations (pages 86 and 60). Students pursuing these concentrations design their own courses of study in consultation with faculty advisors affiliated with the program. Both concentrations offer students extensive opportunities to do independent work and to explore areas of special interest.

HONOR SOCIETIES
National academic honorary societies include Phi Beta Kappa, Tau Beti Pi (engineering), Beta Gamma Sigma (business, graduate students only), Sigma Theta Tau (nursing), and Alpha Omega Alpha (medicine).

ACADEMIC ADVISING
With so many curricular possibilities and combinations available to undergraduates, Rochester takes seriously its obligation to help students find the programs best suited to them. See the Academic Support section (page 175).
1993 FALL SEMESTER
September 8 (Wednesday)
Classes begin at River Campus colleges and School of Nursing.

September 28 (Tuesday)
Last date for students in the College of Arts and Science to add independent study courses.

October 1 (Friday)
Fall term break begins at end of day at River Campus colleges and School of Nursing.

October 6 (Wednesday)
Classes resume.

October 7 (Thursday)
Last date for students in the College of Arts and Science to have courses deleted from current program.
Last date for students in the College of Arts and Science to add courses.
Last date for students in the College of Arts and Science and the College of Engineering and Applied Science to declare the S/F option.

October 28 (Thursday)
Last date to make program changes for students in the College of Engineering and Applied Science.

November 2–4
Registration materials distributed to undergraduates.

November 8–12
Undergraduate program advising.

November 12 (Friday)
Last date for students in the School of Nursing to declare the S/F option for the second elective period.

November 15–19
Undergraduate Program Approval Forms filed with Registrar.

November 24 (Wednesday)
Thanksgiving recess begins at noon.

November 29 (Monday)
Classes resume.

December 13 (Monday)
Last date for transfer students in their first semester in the College of Arts and Science and the School of Nursing to declare the S/F option.

December 13 (Monday)
Classes end. Last date for students in the College of Arts and Science, the College of Engineering and Applied Science, and the School of Nursing to drop courses without penalty.

December 14 (Tuesday)
Reading period begins (optional by college offering course).

December 15 (Wednesday)
Reading period ends.

December 16–22
Final examinations.

December 22 (Wednesday)
Winter recess begins at end of day.

1994 SPRING SEMESTER
January 17 (Monday)
Classes begin at River Campus colleges and School of Nursing.

February 4 (Friday)
Last date for students in the College of Arts and Science to add independent study courses.

February 11 (Friday)
Last date for students in the College of Arts and Science to have courses deleted from current program.
Last date for students in the College of Arts and Science to add courses.
Last date for students in the College of Arts and Science and the College of Engineering and Applied Science to declare the S/F option.
Last date for students in the School of Nursing to declare the S/F option for the first elective period.

March 4 (Friday)
Last day to make program changes for students in the College of Engineering and Applied Science.

March 5 (Saturday)
Spring recess begins at end of day.

March 14 (Monday)
Classes resume.

March 29–31
Registration materials distributed to undergraduates.

April 4–8
Undergraduate program advising.

April 8 (Friday)
Last date for students in the School of Nursing to declare the S/F option for the second elective period.
### April 11–15
Undergraduate Program Approval Forms filed with Registrar.

### April 22 (Friday)
Last date for transfer students in their first semester in the College of Arts and Science to declare the S/F option.

### May 2 (Monday)
Classes end. Last date for students in the College of Arts and Science, the College of Engineering and Applied Science, and the School of Nursing to drop courses without penalty.

### May 3 (Tuesday)
Reading period begins (optional by college offering course).

### May 8 (Sunday)
Reading period ends.

### May 9–16
Final examinations.

### May 21–22
Commencement Weekend.

#### 1994 SUMMER

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 23</td>
<td>First day of classes for the full summer session, six-week session A6, and short session A4.</td>
</tr>
<tr>
<td>June 15</td>
<td>Last day of classes for short session A4.</td>
</tr>
<tr>
<td>June 16–17</td>
<td>Final examinations for short session A4.</td>
</tr>
<tr>
<td>June 20</td>
<td>First day of classes for short session B4.</td>
</tr>
<tr>
<td>June 28</td>
<td>Last day of classes for six-week session A6.</td>
</tr>
</tbody>
</table>

### July 4
No classes.

### July 5 (Tuesday)
First day of classes for six-week session B6.

### July 13 (Wednesday)
Last day of classes for short session B4.

### July 14–15
Final examinations for short session B4.

### July 18 (Monday)
First day of classes for short session C4.

### August 10 (Wednesday)
Last day of classes for full summer session, short session C4, and six-week session B6.

### August 11–12
Final examinations for full summer session, short session C4, and six-week session B6.

#### 1994 FALL SEMESTER

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>September 8</td>
<td>Classes begin at River Campus colleges and School of Nursing.</td>
</tr>
<tr>
<td>September 28</td>
<td>Last date for students in the College of Arts and Science to add independent study courses.</td>
</tr>
<tr>
<td>September 30</td>
<td>Fall term break begins at end of day at River Campus colleges and School of Nursing.</td>
</tr>
<tr>
<td>October 5</td>
<td>Classes resume.</td>
</tr>
<tr>
<td>October 7</td>
<td>Last date for students in the College of Arts and Science to have courses deleted from current program. Last date for students in the College of Arts and Science to add courses.</td>
</tr>
</tbody>
</table>

### Last date for students in the College of Arts and Science and the College of Engineering and Applied Science to declare the S/F option.

### November 1–3
Registration materials distributed to undergraduates.

### November 7–11
Undergraduate program advising.

### November 12 (Friday)
Last date for students in the College of Engineering and Applied Science to declare the S/F option.

### November 14–18
Undergraduate Program Approval Forms filed with Registrar.

### November 23 (Wednesday)
Thanksgiving recess begins at noon.

### November 28 (Monday)
Classes resume.

### December 13 (Tuesday)
Last date for transfer students in their first semester in the College of Arts and Science and the School of Nursing to declare the S/F option.

### December 13 (Tuesday)
Classes end. Last date for students in the College of Arts and Science, the College of Engineering and Applied Science, and the School of Nursing to drop courses without penalty.

### December 14 (Wednesday)
Reading period begins (optional by college offering course).
December 15 (Thursday)
Reading period ends.

December 16–22
Final examinations.

December 22 (Thursday)
Winter recess begins at end of day.

1995 SPRING SEMESTER

January 23 (Monday)
Classes begin at River Campus colleges and School of Nursing.

February 10 (Friday)
Last date for students in the College of Arts and Science to add independent study courses.

February 17 (Friday)
Last date for students in the College of Arts and Science to have courses deleted from current program.
Last date for students in the College of Arts and Science to add courses.
Last date for students in the College of Arts and Science and the College of Engineering and Applied Science to declare the S/F option.
Last date for students in the School of Nursing to declare the S/F option for the first elective period.

March 10 (Friday)
Last day to make program changes for students in the College of Engineering and Applied Science.

March 11 (Saturday)
Spring recess begins at end of day.

March 20 (Monday)
Classes resume.

April 4–6
Registration materials distributed to undergraduates.

April 10–14
Undergraduate program advising.

April 14 (Friday)
Last date for students in the School of Nursing to declare the S/F option for the second elective period.

April 24–28
Undergraduate Program Approval Forms filed with Registrar.

April 28 (Friday)
Last date for transfer students in their first semester in the College of Arts and Science to declare the S/F option.

May 8 (Monday)
Classes end. Last date for students in the College of Arts and Science, the College of Engineering and Applied Science, and the School of Nursing to drop courses without penalty.

May 9 (Tuesday)
Reading period begins (optional by college offering course).

May 14 (Sunday)
Reading period ends.

May 15–22
Final examinations.

May 27–28
Commencement Weekend.

1995 SUMMER

May 30 (Tuesday)
First day of classes for the full summer session, six-week session A4, and short session A4.

June 21 (Wednesday)
Last day of classes for short session A4.

June 22–23
Final examinations for short session A4.

June 26 (Monday)
First day of classes for short session B4.

July 4 (Tuesday)
No classes.

July 5 (Wednesday)
Last day of classes for six-week session A6.

July 6–7
Final examinations for six-week session A6.

July 10 (Monday)
First day of classes for six-week session B6.

July 19 (Wednesday)
Last day of classes for short session B4.

July 20–21
Final examinations for short session B4.

July 24 (Monday)
First day of classes for short session C4.

August 15 (Tuesday)
Last day of classes for full summer session, short session C4, and six-week session B6.

August 16–17
Final examinations for full summer session, short session C4, and six-week session B6.
ADMINISTRATIVE OFFICERS
Richard N. Aslin, Ph.D. (Minnesota) Dean
William Scott Green, Ph.D. (Brown) Dean of Undergraduate Studies and Senior Associate Dean
Dale W. McAdam, Ph.D. (Iowa) Dean for Freshmen
Celia Applegate, Ph.D. (Stanford) Dean for Sophomores
Ruth A. Hopkins, M.B.A. (Rochester) Assistant Dean for Administration
Suzanne J. O'Brien, B.A. (Rochester) Assistant Dean
Dana Rittenhouse, A.A.S. (Rochester Institute of Technology) Secretary to the College
Kenneth E. Clark, Ph.D. (Ohio State) Dean Emeritus

The College of Arts and Science offers degree programs leading to the bachelor of arts and to the bachelor of science. In addition, it provides the first two years of instruction for students planning degrees in the School of Nursing and the College of Engineering and Applied Science, as well as the first three years for students admitted to 3-2 programs in community health and management, and the full course of study for 3-2 programs in computer science, public policy analysis, and applied mathematics.

PLANNING AN UNDERGRADUATE PROGRAM
Human inquiry is much more than an amassing of facts. It is a creative process and an attempt to overcome the limitations of common sense or naked-eye perception, the experiences of a single lifetime, or the wisdom of a single culture. The degree requirements and special programs of the College of Arts and Science are intended to help undergraduates acquire the knowledge and the intellectual tools they will need to participate in this adventure.

The freshman year is a time for special attention. In addition to the Traditional Approach (page 34), which allows students to choose from the entire range of courses open to freshmen, the College of Arts and Science has developed a series of Freshman Ventures. These programs, described on page 34, allow freshmen to take approximately half of their first year's work as a single block. As a further special opportunity for freshmen, the College offers Preceptorials, which are seminars designed exclusively for first-year students and limited to about 15 participants (see page 35).

To foster an intelligent choice of concentration and to guide students in their choice of courses outside the concentration, the College has established its foundation requirements. Formal studies, foreign language, and writing requirements set minimum standards in three important areas and reflect the value the college places on clear reasoning and effective expression. In addition, distribution requirements in the humanities, social sciences, and natural sciences ensure contact with the traditional divisions of scholarship and help students become aware of the span of knowledge and the place of their chosen fields of specialization within the encompassing human search for order and meaning.

To promote an initial understanding of the different modes of inquiry at a time when such understanding will help students make vital curricular and career choices, the College requires students to take courses in each of the foundation groups during their freshman and sophomore years. The foundation requirements provide a basis for continued learning, while leaving room for many other courses.

As students proceed through their undergraduate years, concentration requirements help them develop the habits of thought associated with extensive study of a specific field. Through coursework, independent study, research opportunities, and internships, students acquire both the specialized knowledge they will need for later work in their chosen field and the general skills that derive from intellectual mastery of complex and interrelated topics.

To supplement concentration programs, a wide range of minors and certificates has been added to the offerings of most of the departments within the College of Arts and Science. Although no student is required to have a minor, the option encourages those who choose it to acquire a broad knowledge of another discipline or to pursue a special subfield in depth. Requirements for minors are described in the listings of the departments that offer them.

REQUIREMENTS FOR THE DEGREES BACHELOR OF ARTS AND BACHELOR OF SCIENCE
To ensure that students acquire a broad base of general knowledge, as well as extensive familiarity with at least one area of specialization, the College has established general degree requirements. These requirements are identical for the B.A. and B.S. degrees.

1. Completion of eight semesters of approved coursework, i.e., 32 four-credit courses or 128 credit hours, with an average grade of "C" or better. No more than 20 courses from a single department, no more than three courses from naval science, and no more than eight credit hours of dance technique may be counted toward the degree. For students not majoring in music, no more than eight credit hours of applied music instruction and four credit hours of River Campus ensemble may be counted toward the degree.

2. The satisfactory completion of a program of concentration with an average grade of "C" or better. Requirements for these programs are described under the various department headings. Students must make formal application to a department or an area of concentration by the end of the sophomore year and must file in the College Center for Academic Support a program of concentration approved by the appropriate faculty advisor in the department of concentration. As some departments do not accept coursework taken outside the College of Arts and Science toward the concentration, students should consult departmental advisors concerning the possibility of receiving credit for outside work.

3. Fulfillment of the foundation requirements:
   a. Entering students must establish competence in writing effective prose. Students who have not established such competence must complete, by the end of the freshman year, an appropriate course in English...
in which emphasis is placed on the writing of effective prose (ENG 103-109) or an approved Ventures composition course in another department (such as CLA 105 or LIT 109). The procedures by which competence is established are determined by the College Writing Committee administered by the English department.

b. As early as possible, but at the latest by the end of the junior year, every student must demonstrate knowledge of one foreign language, ancient or modern. (Certain departments require specific languages for their B.S. candidates.) Students will fulfill this requirement by achieving a satisfactory score on a test authorized by the College of Arts and Science or by successfully completing a 103-level course in a foreign language or a 106-level course in American Sign Language. Students with no previous language background may expect to achieve the required level of proficiency within two to three semesters of college study.

c. Before graduation, each student must successfully complete at least the following courses:

- two courses in the humanities (Group I)
- two courses in the social sciences (Group II)
- two courses in the natural sciences (Group III)
- one course in formal reasoning (Group IV)
- two authorized courses, in addition to the course used to fulfill the primary writing requirement, in which sustained attention is given to writing (Group V).

Of these courses, at least one from each of Groups I, II, and III must be completed during the freshman year, and the requirement from Group IV must be satisfied by the end of the sophomore year.

GROUP III.

Natural Sciences: astronomy; biology; chemistry; cognitive science 101 and 201; geological sciences (except geology 270); physics; psychology (120-159, 220-259, 320-359); courses in the Undergraduate Program in Biology and Medicine.

GROUP IV.

Formal Studies: cognitive science 272; computer science; geology 270; philosophy 210-219; mathematics (except 140 and 300); statistics.

GROUP V.

Writing: Selected courses throughout the College of Arts and Science, as certified by the College Writing Committee. A list of these courses is made available prior to registration.

No course may be used to fulfill more than one part of the foundation requirement. No more than two courses from the department of the student’s concentration may be applied towards the Group I-V requirements. (Students with double concentrations should specify one department as the “major” department for the purposes of this requirement.)

Coursework offered in naval science may not be counted toward these requirements, nor may coursework taken in the freshman year be applied toward the foundation requirements. Some courses are not readily classified; similarly, courses that carry a CAS number do not always meet foundation requirements. In cases of doubt, the student should obtain clarification from the College Center for Academic Support.

No course may be used to fulfill more than one part of the foundation requirement. No more than two courses from the department of the student’s concentration may be applied towards the Group I-V requirements. (Students with double concentrations should specify one department as the “major” department for the purposes of this requirement.)

Coursework offered in naval science may not be counted toward these requirements, nor may coursework taken in the freshman year be applied toward the foundation requirements. Some courses are not readily classified; similarly, courses that carry a CAS number do not always meet foundation requirements. In cases of doubt, the student should obtain clarification from the College Center for Academic Support.

FRESHMAN OFFERINGS

THE TRADITIONAL APPROACH

Students who desire maximum flexibility in course choice, the ability to start working toward a desired concentration from the first semester on, or the opportunity to build a general foundation according to their own special interests will want to consider the Traditional Approach. Assisted by an advisor, students following this approach choose an appropriate group of courses (usually four each semester) from the entire range of offerings open to freshmen. Some of these courses lay a basis for a choice of concentration. Others fulfill basic requirements for graduation and provide the first college-level steps toward a liberal education. Students in the Traditional Approach are encouraged to include a Freshman Preceptorial in their course of study (see description, following)

FRESHMAN VENTURES

The Freshman Ventures Program is supervised by a faculty committee and is administered through the College Center for Academic Support, which is located in 312 Lattimore Hall.

VENTURES ADVISORY COMMITTEE

Anthony T. Carter, Ph.D. (Cambridge)
Professor of Anthropology
Carl Chiarenza, Ph.D. (Harvard) Professor of Art History
James Faraz, Ph.D. (Chicago) Professor of Chemistry
Lawrence W. Lundgren, Jr., Ph.D. (Yale)
Professor of Geology
Dale W. McAdam, Ph.D. (Iowa) Professor of Psychology and Dean for Freshmen
Jarold W. Ramsey, Ph.D. (Washington) Professor of English
Harry Reis, Ph.D. (NYU) Professor of Psychology and Associate Professor of Education and Human Development
*Celia Applegate, Ph.D. (Stanford) Dean for Sophomores; Associate Professor of History, Chair of the Committee
David Pollack, Ph.D. (California, Berkeley) Associate Professor of Japanese and Chinese

While courses chosen under the Traditional Approach are independent of one another, students who are accepted into a Freshman Venture take approximately half of their coursework as an integrated sequence. Participants enjoy year-long opportunities for contact with faculty members and students who share their interests.

*Ex officio member of the committee.
All of the Ventures offer multidisciplinary introductions to college study. Rather than being organized around a single theme throughout the year, they consist of separate courses, each of which has its own subject and goals, but is nevertheless linked to the other courses by a common approach. In addition, all of the Ventures stress fundamental skills of analysis and exposition.

Each Venture satisfies several basic graduation requirements, including English composition. Enrollment is limited, and admission is by application during the summer prior to matriculation.

Ventures offered in 1992-93 included the following:

**Foundations of Western Culture.**
A multidisciplinary examination of the origins, development, and nature of European civilization from pre-Homeric Greece to the beginning of the modern period. Participating departments include history; English; fine arts; foreign languages, literatures, and linguistics; philosophy; political science; and religion and classics.

Completion of this Venture satisfies the primary writing requirement, one or two social science requirements, one humanities requirement, and in some cases one upper-level writing requirement.

**Ourselves and Others: Cultural Diversity in the Contemporary World.**
An exploration of the nature and consequences of cultural diversity in the formation of the contemporary world, including the opportunity to study intensively selected aspects of our own and other cultures. Particular focus is on Japan. Participating departments include anthropology; English; psychology; and foreign languages, literatures, and linguistics.

Completion of this Venture satisfies two social science requirements, the primary writing requirement, and either one humanities or one upper-level writing requirement.

**Social and Biological Determinants of Behavior.**
An exploration of psychological and literary insights concerning personality, character, and the extent to which human behavior is determined by social or biological factors. Participating departments include psychology, English, and biology.

Completion of this Venture satisfies the primary writing requirement, one or two natural science requirements, one social science requirement, and, in some cases, one upper-level writing requirement.

**Resources, Environment, and Political Choice.**
An investigation of the use of geology, political science, and literature in the evaluation of the risks and benefits associated with our natural resources. Participating departments include geology; political science; and foreign languages, literatures, and linguistics.

Completion of this Venture satisfies the primary writing requirement, one social science requirement, and one or two natural science requirements.

**Perception, Image, and Form.**
An exploration of how human perception and interpretation often vary widely from culture to culture, epoch to epoch, and social group to social group. Participating departments include art and art history; psychology; and foreign languages, literatures, and linguistics.

Completion of this Venture satisfies the primary writing requirement, one natural science requirement, and one humanities requirement or two (if AH 207 is taken).

**Energy and the Environment: Chemical Principles and Historical Perspectives.**
The critical issues of energy production and consumption and the impact of technology on the environment are best understood on the basis of firm scientific principles and historical perspectives. In this Venture, we examine the rigorous chemical principles of energy production and consumption, the role of chemical processes and detection methods in understanding the environmental consequences of technology, and the history of science and technology from the eighteenth to the early twentieth century.

Completion of this Venture satisfies the primary writing requirement, two natural science requirements, and one social science requirement. The chemistry courses serve as prerequisites for more advanced science courses requiring a background in general chemistry.

**Language and Thought.**
Which came first, language or thought? How does human language differ from that of other animal communication? Do computers really think? What allows all children to learn language so fast? Do Navajo speakers form thoughts in the same way as English speakers? Are the world's languages really so different? These and many other questions will be treated in this interdisciplinary introduction to the language sciences from a variety of perspectives of interest to linguists, psychologists, philosophers, and rhetoricians.

Completion of this Venture satisfies the primary writing requirement, two social science requirements, and one natural science requirement.

**FRESHMAN PRECEPTORIALS.**
Preceptorials are seminars offered exclusively for freshmen. In contrast to the Ventures, Preceptorials consist of single courses, the subject matter of which tends to be more specialized than that of the courses that make up the Ventures. Each Preceptorial is limited to about 15 students, who are selected from among those who express an interest in it. Preceptorials include directed reading, seminar discussions, and critical reports. Preceptorials carry full course credit and may be applied toward distribution requirements. If their schedules allow, students in a Venture sequence may also enroll in a Freshman Preceptorial.

A list of Preceptorials, together with information on application procedures, is mailed to freshmen prior to orientation and registration. A sampling of offerings is listed below.

**ART AND ART HISTORY**

**190. The Art of East and West.** A comparative study of masterworks of painting and sculpture. Selected examples are analyzed in detail and interpreted with reference to the aesthetic and social ideals of the civilization(s) which produced them. The course is an introduction to the great traditions of world art.

**COLLEGE OF ARTS AND SCIENCE**

**195. Science as Seen through the Lives of Scientists.** Extensive readings in the lives of several scientists. Among those included are Newton, Darwin, Planck, Oppenheimer, J. Watson, and Rosalind Franklin.

**ENGLISH**

**190. Reading Autobiography.** This course reads and discusses autobiographies both classic and modern from St. Augustine and Rousseau to Maxine Hong Kingston and Malcolm X. Writing assignments lead students to think about the rhetorical and imaginative strategies of the texts and also engage them in writing about their own lives, both real and imagined.

**HISTORY**

**190. Classical Civilizations.** Examines the historical perception which demands a "classical" base for Western civilization. Readings, papers, and discussion center on the meaning of this term, and ways in which we define and redefine it, beginning with definitions which come from the period (roughly, B.C. 500 to A.D. 400) itself. Same as CLA 190.

**191. Russian Revolution.** This course deals with the history of the Russian Revolution,
Problem-Solving Techniques focuses on the analysis and solution of mathematical problems. Assignments are tailored to students' levels of proficiency in mathematics.

Methods of Inquiry teaches students assessment of their current academic skills; theoretical processes underlying learning and memory; study behavior and behavioral change; specific study techniques; and how to apply this knowledge to their coursework.

Issues in American Life examines topics like racism, ecological crises, and abortion; challenges students to work with a variety of lecturers; and emphasizes critical listening and analysis, articulation of lectures with textual materials, and abilities to prepare for and take college examinations. This is a "laboratory" for Methods of Inquiry.

Self and Society examines students' current and future roles in society. Career decisions and values are studied, and the influences of motivation and attitude are identified. College survival skills are emphasized.

EXTRA-DEPARTMENTAL COURSES

The following list of courses reflects current interests of students and faculty. Course listings are published in the Schedule of Courses and are posted in Lattimore Hall each semester. Expanded descriptions of current courses are also published each semester.

CAS 100. Introduction to Small Computers. A look at computers, how they work, and what they are used for. Basics of computer hardware and software, with an emphasis on what is commercially available. Computer applications. No degree credit in the College of Arts and Science. (Spring and Fall)

CAS 106. Beginning Personal Computer Applications. A hands-on course on how to use a personal computer for practical applications. Emphasis is on software compatible with industry standards. No degree credit in the College of Arts and Science. (Fall and Spring)

CAS 107. Advanced Personal Computer Applications. A hands-on course, covering more advanced features of WordPerfect and Lotus 1-2-3 for the IBM PC. No degree credit in the College of Arts and Science. (Fall and Spring)

CAS 116. Introduction to Community Medicine. Analysis of current issues in the organization, financing, and evaluation of personal and public health care. (Fall)

CAS 150. GO = Game and Culture. An introduction to the ancient oriental game of GO. Study of the game is used as a window on Japanese culture and as a model of conflict. (Fall)

DANCE COURSES

Only eight credit hours of dance technique (171-277, excluding 281) may be applied toward the degree. Students can continue in dance technique on a noncredit basis.

171. Introduction to Ballet. Credit—2 hours. Ballet fundamentals including barre work, center work, adagio, and basic combinations. May be repeated for credit. (Fall and Spring)

CAS 175. Modern Dance I. Based on the fundamental movement patterns; skipping, walking, running, leaping, etc. Students develop ease and clarity in performing these movements. This course emphasizes spontaneity and joy in moving. (Fall and Spring)

271. Intermediate Ballet. Credit—2 hours. Continuation of SA 171. This course includes barre work, center work, and adagio and allegro combinations. May be repeated for credit. (Fall and Spring)

CAS 275. Modern Dance II. This class is a continuation of the material taught in the beginning class, emphasizing a greater movement vocabulary. Course also includes work on musicianship and alignment through the use of imagery. Prerequisite: CAS 175 or equivalent coursework (or experience). (Spring)

CAS 375. Performance and Improvisation. Students build on skills developed in prior modern dance classes and previous courses and experience, and develop improvisational skills, geared toward performance. Prerequisite: CAS 175, CAS 275 or equivalent coursework (or experience). (Fall and Spring)

DEPARTMENTAL COURSE OFFERINGS AND PROGRAM REQUIREMENTS

The College of Arts and Science departmental courses described between this page and page 135 were offered in 1992-93. Those exceptions are usually noted. Updated course offerings are listed in the Schedule of Courses, which is published in March and November of each year.
The Frederick Douglass Institute for African and African-American Studies offers an interdisciplinary program of courses.

ASSOCIATES AND FACULTY

Joseph E. Inikori, Ph.D. (University of Ibadan, Nigeria)  Professor of History

and of African History, Associate Director

of the Frederick Douglass Institute for

African and African-American Studies

Karen E. Fields, Ph.D. (Brandeis)  Professor of Religion

Samuel C. Nolutshungu, Ph.D .

(Manchester)  Professor of Political

Science and of African Politics

Jesse T. Moore, Ph.D. (Pennsylvania

State)  Associate Professor of History

Elias Mandala, Ph.D. (Minnesota)

Associate Professor of History

Larry E. Hudson, Jr., Ph.D. (Keble University,

UK)  Assistant Professor of History

The Frederick Douglass Institute for African

and African-American Studies sponsors pro-

grams of teaching and research at the under-

graduate level. As part of the College of Arts

and Science, the Institute has a broad man-

date in undergraduate and graduate educa-

cation, advanced research, and exchange within

the University community and beyond. It is

the focal point for African and African-Ameri-

can Studies at the University.

Institute courses are cross-listed with those

of anthropology, economics, history, English,

foreign languages, literatures and linguistics,

political science, chemical engineering, wom-

en's studies, and religion and classics.

In addition to the courses offered, the Insti-

tute sponsors an annual Residential Fellow-

ship Program (postdoctoral, predoctoral,

and graduate study), Visitingships for Distingui-

shed Professors and Undergraduate Re-

search made possible by a grant from The

Ford Foundation, Frederick Douglass Forums,

conferences, a research initiative, Access to

Hydrocarbon Energy for African Develop-

ment, and administering the APT Program

(a volunteer tutorial program for high-school

students).
COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

105. Introduction to Third World Politics. An introduction to the comparative politics of the third world. Africa is compared to Europe and Asia for a better overall understanding. Cross-listed PSC 150. (Fall)

205. Black Intellectuals and the Crisis of the Twentieth Century. Considers major political thinkers in the United States, Africa, and the Caribbean by placing their work in historical context. Cross-listed with PSC 283. (Fall)

219. A Practicum in Teaching Technical Subjects. The course is designed for student tutors in the APT Program. Teaching techniques are discussed, as well as practical problems. (Spring)

232. A Twenty-First-Century Study of Mozambique. Sectors of the country's economy, resources, and society are selected to re-search and work with a model to predict conditions in the country to the year 2050, and assess policy options. Cross-listed with HIS 243/PPA 441. (Spring)


305W. Advanced Seminar on Black Intellectuals and the Crisis of the Twentieth Century. Advanced readings and research course designed for students who have taken "Black Intellectuals and the Crisis of the Twentieth Century," or an equivalent acceptable to the instructor. Cross-listed with PSC 363W. (Spring)

ADDITIONAL COURSES

105. Introduction to Third World Politics. Same as PSC 150. (Fall)

107. History of Islam. Same as REL 107. (Fall)

120. The Black Family in Historical Perspective. Same as HIS 120. (Fall)

133. From Slavery to Revolution: The Impact of Capitalism on the Peoples of Africa, Asia, and Latin America. Same as ANT 133. (Spring)

142. Black American Society Since 1900. Same as HIS 142. (Spring)

150. Topics of Afro-Hispanic Literature. Same as LIT 150. (Spring)

202. The Third World. Same as HIS 202. (Fall)

203. Inequalities and Resistance: Race, Class, and Gender. Same as ANT 131. (Spring)

210. State and Society in Africa. Same as PSC 266. (Spring)

215. Race and Gender in Afro-Hispanic Literature. Same as SP 288/CIT 217. (Spring)

222. Afro-American Literature: Autobiography and Beyond. Same as ENG 226. (Fall)

230. Economics of African-American Slavery. Same as ECO 228. (Fall)

246. Cry Freedom: Liberation Theologies of Africa and the Americas. Same as REL 246. (Spring)

252. Economies and Societies in Latin America and the Caribbean since 1492. Same as HIS 242. (Fall)


257. Comparative Political Economy. Same as ANT 266/466. (Fall)

264. Urban Economics: Prospects for Metropolitan America. Same as ECO 264. (Spring)

266. Colonial and Contemporary Africa. Same as HIS 266. (Fall)


278. Islam and the Third World. Same as REL 278. (Fall)

280. Just and Unjust Wars. Same as PSC 277/477. (Spring)

288. History of the American South II. Same as HIS 288. (Spring)

297. South Africa: A History of Apartheid. Same as HIS 297. (Fall)

335. Major Literary Figures: Toni Morrison. Same as ENG 335. (Spring)

339. Religion, Slavery, and Race in the Old South. Same as REL 339. (Spring)

349. Plantation Societies in the Americas. Same as HIS 349. (Spring)

354. State and Revolution in Southern Africa. Same as HIS 354. (Spring)

356. The Black Family in Slavery and Freedom. Same as HIS 356. (Fall)


372. The Civil War: A Search for National Unity. Same as HIS 372. (Spring)

373. North Africa and the Middle East in the Age of Imperialism. Same as HIS 373. (Spring)

375. The Atlantic Slave Trade and Africa, 1650–1850. Same as HIS 385/ECO 385. (Fall)

376. Women and History in Africa. Same as HIS 376. (Fall)

384. The Food Crisis in Africa. Same as HIS 384. (Fall)

ANTHROPOLOGY

Anthony T. Carter, Ph.D. (Cambridge) Professor of Anthropology and Chair of the Department

Grace Harris, Ph.D. (Cambridge) Professor of Anthropology and of Religion

Walter Hinchman Sargree, Ph.D. (Chicago) Professor of Anthropology

Edward E. Calnek, Ph.D. (Chicago) Associate Professor of Anthropology

Thomas P. Gibson, Ph.D. (London School of Economics) Associate Professor of Anthropology

Robert Foster, Ph.D. (Chicago) Assistant Professor of Anthropology

Ayala Gabriel, Ph.D. (Rochester) Assistant Professor of Anthropology

Alfred Harris, Ph.D. (Cambridge) Professor Emeritus of Anthropology

Robert S. Merrill, Ph.D. (Chicago) Professor Emeritus of Anthropology

René Millon, Ph.D. (Columbia) Professor Emeritus of Anthropology

A teaching assistant occasionally helps with discussion sections and grading in large courses.

Anthropology is the comparative study of human societies and cultures. Anthropologists seek to understand how we interact with one another and how different patterns of social interaction shape, and are shaped by, cultural values and systems of meaning. Anthropologists may be concerned with phenomena as diverse as the first stages of urbanization in pre-Hispanic Mexico, the relations between politics and religion in Southeast Asia; the formation of nation-states and national identities in Papua New Guinea, and other ex-colonial states; marriage in Nigeria; or the role of women in Israeli politics. Anthropological studies are based on intensive participant observation of single societies and on careful cross-cultural comparison.

The Department of Anthropology offers programs of study leading to the B.A. degree, the B.A. degree with honors, and, at the graduate level, the M.A. and Ph.D. degrees. Students may minor in anthropology by following one of the four plans described below. There is a general minor in anthropology as well as specialized minors in medical anthropology and archaeology and ethnology.
CONCENTRATION REQUIREMENTS IN ANTHROPOLOGY

Twelve courses are required for a concentration in anthropology.

1. Nine courses in anthropology of which at least seven must be beyond 200. The seven advanced courses must include:
   - At least three core courses in anthropology: ANT 201, 202, 203, and 204
   - At least one course in regional ethnography: ANT 240, 241, 242, 243, 245, 246, or 249
   - ANT 301, "The History of Anthropological Thought"
   - A research seminar: ANT 351-370.
   - Two courses beyond the introductory level in an allied field. All allied field courses typically are taken in the same department, but an allied field course composed of a mixture of courses from different departments may be substituted with the approval of the departmental advisor.

THE HONORS PROGRAM

Students wishing to graduate with honors in anthropology must fulfill the normal requirements of the undergraduate concentration and must in addition:

- Successfully complete an additional research seminar: ANT 351-370
- Successfully complete ANT 392, "Honors Research in Anthropology"
- Submit an acceptable Honors Thesis by April 1 of the senior year and present the thesis for review by a committee of the department.

REQUIREMENTS FOR MINORS

Anthropology

Six courses in anthropology are required:

- An introductory course: ANT 101-199
- Two of the core courses in anthropology: ANT 201-204
- Two additional 200-level courses
- ANT 301, "The History of Anthropological Thought."

Medical Anthropology

Six courses are required:

- An introductory course: ANT 101-199
- Two of the core courses in anthropology: ANT 201-204
- ANT 216, "Medical Anthropology"
- Two courses from among ANT 208, 218, and 220.

Archaeology

- Three of the following 200-level courses: ANT 210, 241, or 245; or AH 220.

CORE COURSES IN ANTHROPOLOGY

201. Observing Humankind—Doing Anthropology. An introduction to the craft of social and cultural anthropology. Exercises in data collection and anthropological writing in the Rochester community and elsewhere. Primarily for anthropology majors and majors in the social sciences and humanities. (Spring)

202. Social Theory: Enduring Issues and Contemporary Ethnographic Studies. The influence of social theory on the collection and analysis of ethnographic data. Primarily for anthropology majors and majors in the social sciences and humanities. (Fall)

203. Language and Culture. The study of language in interaction with society and culture. Primarily for anthropology majors and majors in the social sciences and humanities. (Spring)

TOPICS IN ANTHROPOLOGY

205. Society, Culture, and Personality. Relationships among socialization procedures, social structure, and ideological and "expressive" aspects of selected cultures. (Fall)

206. Early Civilizations of the Old World and the New. Comparative study of Near Eastern, Chinese, Middle American, and Andean civilizations. (Fall)

208. Cultural Factors in Aging. Beliefs about aging and the aged examined in the context of the social roles and behavior actually assumed by the elderly in differing cultures. (Fall)

213. Gender and the State. The effect of the state on gender concepts, reproductive rights, and women's labor force participation in Eastern Europe, the United States, and elsewhere. (Spring)

216. Medical Anthropology. The study of "disease" and "illness" in relation to society and culture. Comparative analysis of bio- and ethno-medical models. Prerequisite: one course from among ANT 201-204 or permission of the instructor. (Spring)

217. The American Family in a Changing Society. Explorations of current issues facing the American family as expressions of contemporary change, cultural diversity, ethnic heritage, and core American values. (Spring)

218. Birth and Death: The Anthropology of Vital Events and International Health. Analysis of the interaction of population processes and human welfare. Implications for population and health policy and for development are examined. (Spring)

220. Healing and Ritual. How various cultures bring ritual to bear on the diagnosis and treatment of bodily ills and misfortunes. (Fall)
235. Gender Theories: "Man the Hunter/Woman the Gatherer" and Beyond. Cross-cultural examination of theories of gender in the social and human sciences. The history of feminist anthropology. (Spring)

240. Southeast Asian Ideologies. Concepts of social and religious order in Southeast Asia, contrasting the tribal highlands with the Buddhist and Muslim civilizations of the lowlands. (Fall)

241. Ancient Mesoamerica. Rise of civilization in Middle America from the earliest time to the Spanish Conquest. (Fall)

242. Native Peoples of North America. An examination of anthropological studies of Native American cultures, organized around the developing theoretical concerns that have informed research. (Spring)

243. Knowledge, Power, and Ritual: Topics in Pacific Ethnography. An introduction to the societies and cultures of Melanesia through ethnographic investigations of such topics as myth, ritual, gift exchange, gender and socialization; political economy, knowledge and power, colonial history, and the politics of producing a national culture in postcolonial states.

245. Religion in Ancient Mesoamerica. Myth, ritual, calendar, religious architecture, and human sacrifice among the Aztecs, Mayas, and other peoples of pre-Hispanic America. (Spring)

246. Peoples of Africa. An examination of the varieties of social structure in selected areas of sub-Saharan Africa. (Spring)

247. Contemporary Eastern Europe. An exploration of society and culture in Communist and post-Communist Eastern Europe. (Spring)


CENTRAL COURSES

261. Political Anthropology. Comparative analysis of political organization in small-scale societies, with emphasis on maintenance of internal order and external independence. (Spring)

262. Kinship, Marriage, and Gender. Critical examination of a variety of systems of kinship and marriage, and of different approaches to their study. (Spring)

263. Religions: Their Values and Symbols. Exploring rituals and doctrines through selected nonchristian religions in their social-historical contexts. Same as REL 214. (Spring)

265. Disputing: Norms and Processes. An examination of such concepts as authority, the person, responsibility, rights and obligations, guilt and innocence, punishment, freedom, and justice. (Spring)

266. Capitalism in the Third World. The effects of the expansion of capitalism from Europe to Africa, Asia, and Latin America. (Spring)

268. Gender Theories and the Question of the Sexes. Crosscultural examination of theories of gender in the social and human sciences. The history of feminist anthropology. (Spring)

SEMINARS AND INDEPENDENT RESEARCH

301. The History of Anthropological Thought. An examination of the development of the anthropological tradition from the late nineteenth century to the present. Readings are drawn from the works of key figures in the development of American, British, and French anthropology. Prerequisites: two courses from among ANT 201-204 or permission of the instructor.

352. Critical Social Theories. From Marx and Nietzsche to Foucault: knowledge and power in contemporary social theory. (Fall)

354. Gender Theories: "Man the Hunter/Woman the Gatherer" and Beyond. Cross-cultural examination of theories of gender in the social and human sciences. (Spring)


357. Making National Cultures. Recent historical and anthropological discussions about the formation of nation-states and national identities, especially in colonial states.

358. Gender, the Bible, and Politics in Israel. Research seminar on contemporary Israel to explore categories like gender, scripture, and politics in one specific society in the Middle East. (Fall)

359. Culture and Agency. Selected topics in theories of practice, cognition and learning; consumption and everyday life; decision making in demography, economics, and politics; discourse and pragmatics, history and social change; and resistance to domination.

361. Concepts of the Person: Issues in Research. The nature of anthropological research from defining a problem, to proposal writing, through write-up. Student research is on concepts of the person. (Spring)

391. Practicum in Anthropology.

392. Honors Research in Anthropology.

ART AND ART HISTORY

Carl Chiarenza, Ph.D. (Harvard)  Fanny Knapp Allen Professor of Art History
Douglas Crimp, M. Phil. (City University of New York)  Visiting Professor of Art History/Virtual and Cultural Studies
Diran K. Dothanian, Ph.D. (Harvard)  Professor of Art History
Michael Ann Holly, Ph.D. (Cornell)  Professor of Art History/Virtual and Cultural Studies
Roger Mertin, M.F.A. (SUNY, Buffalo)  Associate Professor of Art
Grace Seiberting, Ph.D. (Yale)  Associate Professor of Art History/Virtual and Cultural Studies
David A. Walsh, Ph.D. (Minnesota)  Associate Professor of Art History
Cristelle Baskins, Ph.D. (California, Berkeley)  Assistant Professor of Art History
Leon Dockerty, M.F.A. (Stanford)  Assistant Professor of Art
Allen Topolksi, M.F.A. (Penn State)  Assistant Professor of Art
Mieke Bal, Ph.D. (Utrecht)  Adjunct Professor of Visual and Cultural Studies
Jean France, M.A. (Oberlin)  Adjunct Associate Professor of Art History
Rick Hock, M.F.A. Visual Studies Workshop (SUNY, Buffalo)  Adjunct Instructor in Photography
Michele Lee-Dockerty, M.F.A. (Southern California, Los Angeles)  Instructor** in Art History
Lance Speer, M.F.A. (Rhode Island)  Instructor** in Photography
Howard S. Merritt, Ph.D. (Princeton)  Professor Emeritus of Fine Arts
Archibald Miller, M.F.A. (Cranbrook)  Professor Emeritus of Art and Senior Faculty Associate
Remy G. Saiselin, Ph.D. (Wisconsin)  Professor Emeritus of Fine Arts and French Literature

The Department of Art and Art History uses teaching assistants only in its introductory courses.

*Has applied for one or two semesters of leave in 1993-94.
**Part-time.
The Department of Art and Art History offers courses in the history of art and in the studio arts. This work may lead to a B.A. degree with a concentration in art history, painting, sculpture, or photography; each program provides a basis for graduate study and professional training for those students who wish to pursue careers in the arts, and a sound liberal education for those students whose final degree will be the B.A. Students' programs may be enriched by undergraduate/graduate courses in the Department's graduate program in visual and cultural studies, based on the sociohistorical study of visual and literary texts with an emphasis on theory and criticism. The Department also offers minors in art history and studio arts. A student may major in art history and minor in studio arts; a student majoring in studio arts may minor in art history.

Registration in some courses is strictly limited and is by consent of the instructor.

First-year students and sophomores will be restricted areas. These are useful cognate courses for those students studying a specific period or culture in another discipline, and are also the building blocks for an art history major. Seminars are indicated by the 300 level and are open to advanced students from other disciplines as well as to art history majors.

ART HISTORY

Art history is a field of study in which the information and methodologies of many fields come together. The discipline of art history involves analysis of the work of art itself — understanding its form, and why and how we appreciate it — and also investigation of its historical context and mode of production. These inquiries can lead in many different directions, involving economic, social, and gender issues, problems of patronage and taste, and questions of literary exchange, conservation, and restoration. Art historical studies draw upon adjacent areas of study such as cultural and intellectual history, psychology, literary criticism, religion, philosophy, and the history of science. The history of art is an ideal field for a student who wishes to acquire a general cultural background and to sharpen critical sensibilities.

General Course Information

The courses listed as survey courses cover broad historical periods and serve as introductions to the methods and problems of art history. They are useful to both first-year and upper-class students who want a general overview. Sophomores, juniors, and seniors, as well as first-year students who have had a course in art history or some other relevant preparation, may begin at the 200 level as well as the 100 level. The 200-level courses offer similar introductions but in much more restricted areas. These are useful cognate courses for those students studying a specific period or culture in another discipline, and are also the building blocks for an art history major. Seminars are indicated by the 300 level and are open to advanced students from other disciplines as well as to art history majors.

CONCENTRATION IN ART HISTORY

The Department offers a variety of programs of study in art history which are structured around a diversity of individual interests and career plans. Students construct their studies with the aid and direction of the Department advisor and a faculty sponsor, following one of four broadly defined thematic approaches or "tracks":

- Contemporary Issues
- Architectural Study
- History and Culture
- Media, Materials, and Museums

Each student takes two introductory courses in art history, five of the regularly offered and one independent study in the "track" group, four courses in art history outside the "track," and one course in studio art. Exploration of the field of art history may include substantial experience with works of art through internships or other special programs at the Memorial Art Gallery, the Strong Museum, and the International Museum of Photography at George Eastman House. In addition, study abroad during a fall or spring semester in a program sponsored by the Department of Art and Art History is encouraged for majors and non-majors alike. There are opportunities to work in institutions such as the Victoria and Albert Museum and the Museum of London; and internships can be arranged in Paris, Brussels, Bonn, and Madrid.

REQUIREMENTS FOR HONORS IN ART HISTORY

A student wishing to be considered a candidate for honors in art history must meet the following requirements before applying:

- Have a grade-point average of 3.3 within the major.
- Have completed the established minimum distribution requirement in the major.
- Have completed a 200-level or higher art history course or have otherwise demonstrated competence in the area of study of the proposed honors project.

To apply, submit to the Department an honors project proposal that has been mutually agreed upon (signed) by the student and his or her chosen faculty advisor. Following acceptance of the proposal by the Department, the candidate must complete the requirements listed below:

- A minimum of 12 credit hours in honors courses: 4 credits in a 300-level seminar in art history; 4 in AH 393, senior project (the honors course); and 4 in a course given outside the art and art history department (e.g., in the history department) which is related to the honors project. The latter is intended to provide a broader or deeper understanding of the period or area of the honors project and normally will be a 200-level course selected in consultation with...
the honors faculty advisor and taken in the spring semester of the junior year or fall semester of the senior year.

- Completion of a distinguished essay, approximately 33 pages in length, which may be a seminar paper, further researched and suitably expanded, or it may be the direct product of AH 393 (senior project). In addition to the student's project advisor, a second reader, selected together by the advisor and the student, will evaluate the essay.

- Maintenance of a 3.3 GPA within the major.
- Submission of two complete copies of the essay, one of which will be preserved by the University.

**MINOR IN ART HISTORY**

The Department offers a minor concentration in art history, providing an introduction to the field and a series of courses leading to the major. The minor consists of:

- One course from AH 101 (Introduction to Ancient and Medieval Art), AH 102 (Introduction to Renaissance and Modern Art), AH 103 (Introduction to the Art of India and the Far East).
- Three courses in a historical sequence or on a major topic (e.g., medieval and Renaissance; Asian art; architecture; modern art; critical theory; etc.).
- Two other courses in the Department, of which one may be a studio course.

**REQUIREMENTS FOR INDEPENDENT STUDY IN ART HISTORY**

- Topic for research must not be available within the regular offerings of the Department.
- Faculty director must have relevant expertise in topic area and be willing to supervise the student and to sign a contract stipulating agreed-upon requirements.
- Normally open only to juniors and seniors.
- Semester must result in a completed research paper or equivalent project at an advanced level of achievement.

**STUDIO ARTS**

In studio arts, students find a multifaceted program that allows them to choose their area of concentration. They select courses in drawing, painting, photography, sculpture, computer art, and film-making. These studios offer a solid foundation, and most students enrich their program through study in several disciplines.

Effective art instruction, aside from training in the technical aspects, can be neither formulated nor generalized. At Sage, both introductory and advanced-level courses operate within a well-regulated student/faculty ratio that enables the personalized one-to-one interaction that is vital in art. Each semester a number of studios are offered on a Flex Time/Flex Time basis. Flex Time, as the term implies, elasticizes the time frame in which students choose one-to-one meetings with faculty. These sessions place special emphasis on recognizing issues of development particular to individual investigation and learning. Students are expected to arrive at a weekly one-to-one meeting with their studio faculty. Fix Time is the scheduled core session for group or participatory discussion. A variety of motivators operates during this group time—most significantly the introduction of materials and processes germane to the group and the individual presentations of art production in progress or completed. Distinct labels for studio divisions such as painting, drawing, photography, and sculpture are in fact the broadest indicators of material production. While most distinctions made at Sage in both curriculum and facilities are based on these indicators, the faculty accommodates and encourages those students demonstrating an ardent interest in cross-discipline exploration.

The Sage Art Center's spacious and open studio areas create an interactive surrounding conducive to broad-based learning. A schedule of supplemental hours, monitored by studio assistants, provides ample opportunity for students to further their independent production. A gallery space, AS 15 (Artist's Space in Sage), is governed by students who curate exhibitions solely comprised of student work. This extracurricular activity provides students with an important experience for both artists and organizers and enables student work to be seen in a context beyond the classroom.

The Department recognizes the relation of art to life and art as an affirmation of the self, it is a significant relationship that warrants the attention of every student. Similarly, the Department regards courses in the other humanities and sciences as an integral part of the formation of an artist in today's world.

**CONCENTRATION IN STUDIO ARTS**

A concentration in studio arts must be declared prior to the junior year and requires nine studio and four non-studio courses:

- Four 100-level studios—painting, photography, sculpture, and drawing. Two must be taken prior to the junior year.
- Four 200/300-level studios (including advanced studio) in a single discipline-based area.
- One other 200-level studio.
- Four non-studio courses. At least three of these should be in art history—one prior to the junior year and one examining critical theory; the remaining course is chosen with the consultation of a studio arts advisor.

The studio arts major is required to present an exhibit of recent works for review, preferably in the last semester of the senior year. The student must be prepared to intelligently discuss the work with the studio arts faculty.

**REQUIREMENTS FOR HONORS IN STUDIO ART**

A student wishing to be considered a candidate for honors in studio art must meet the following requirements before applying:

- A grade-point average of 3.3 within the concentration.
- Completion of the established minimum distribution requirement for the concentration.

To apply, submit to the Department an honors project proposal, the subject of which has been mutually agreed upon (signed) by the student and his or her chosen faculty advisor.

Following the acceptance of the proposal by the Department, the candidate must fulfill the following requirements:

- A minimum of 12 credit hours beyond concentration requirements having the following distribution: 4 credit hours in a 300-level studio course; 4 credit hours in a 200-level or higher art history course, preferably in critical theory or an offering relevant to the student's artistic concerns, and agreed upon in consultation with a studio advisor; 4 credit hours in senior project (SA 393). The work involved in SA 393 should include both studio work and a distinguished essay of eight to 15 pages soundly substantiating the student's art with historical and/or theoretical principles. SA 393 should be completed during the senior year and must be evaluated by the chosen faculty advisor and a second reader selected by mutual agreement.

- Submission of two complete copies of the essay and photographic documentation, one of which will be preserved by the University.

- An exhibition or installation of recent work coordinated in the final semester of the senior year. The student will be asked to verbally defend his or her work.

- Maintenance of a 3.3 grade-point average within the concentration.

**MINOR IN STUDIO ARTS**

A minor in studio arts requires five studio and one non-studio course:

- Two studios: SA 111 (drawing), SA 121 (painting), SA 131 (sculpture), or SA 141 (photography).
- Three 200/300-level studios in a single discipline-based area.
- One art history course: AH 113 (History of Photography), AH 161 (Cultural Analysis/Cultural Critique), AH 209 (Workshop in Art Criticism), or one chosen in consultation with a faculty member.
In the senior year students must present a group of work for review and be prepared to discuss it with the studio arts faculty. Students are encouraged to meet with faculty advisors to design a coherent program of study early in their degree process.

Requirements for Independent Study in Studio Art

- Topic for research must not be available within the regular offerings of the Department.
- Faculty director must have relevant expertise in topic area and be willing to supervise the student and to sign a contract stipulating agreed-upon requirements.
- Semester must result in a body of individual studio work or equivalent project at an advanced level of achievement.

Requirements for Graduation with Distinction in Art History or Studio Art

Grade-point average is calculated only from the required concentration courses. Freshman grades, transfer grades, and year-abroad grades (unless given by the University of Rochester) are not computed. Levels of distinction are rated by minimum GPA as follows:

- With Distinction: 3.3
- With High Distinction: 3.5
- With Highest Distinction: 3.7

Courses of Instruction

The following list gives a general indication of the courses that have been offered in the past academic year and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

Art History (AH)

Survey Courses

101. Introduction to Ancient and Medieval Art. A historical survey of the monuments of prehistoric, Egyptian, Mesopotamian, Greek, Roman, and medieval art. (Fall)

102. Introduction to Renaissance and Modern Art. A survey of art from the late Middle Ages to the early twentieth century, and a consideration of fundamental issues in the history of art and culture. (Spring)

103. Introduction to the Art of India and the Far East. A selective survey of the art of India, China, and Japan and an introduction to the methodology of the history of art. (Spring)

104. Art Now. An introduction to recent art (1968 to present), the criticisms it makes, and the criticism it arouses.

Themes in Art and Culture

202. Theory and Interpretation in the Visual Arts. A study of contemporary theoretical perspectives (e.g., Marxism, feminism, psychoanalysis, semiotics) in their relationship to the understanding of the visual arts.

203. Critical Theory. Problems of culture and meaning in the Marxist, feminist, and psychoanalytic traditions, and in structuralism and post-structuralism. Same as CLT 210. (Fall)

204. Imperialism, Ethnocentrism, and Culture. A study of the context of colonial and post-colonial societies. (Spring)


206. Body, Sex, and Death, 1200-1700. A thematic and topical class investigating the corporeal metaphors running throughout Renaissance imagery.

207. Woman as Image and Text. An examination of the female body as a visual and textual image through history.

208. Modernism, Modernity, and Gender. A sociohistorical approach to modernist movements in the visual arts 1890-1940. (Fall)


267. Representing Differences. "Age, race, class, and sex"—enumerated by Audre Lorde in the title of a famous essay from 1980, the list has become multiculturalism's mantra. This course takes up current debates on identity by examining cultural constructions of difference and by approaching differences in their complex interrelations. A wide range of cultural practices are studied, from Hollywood movies to independent videos (Jungle Fever to Tongues Untied), from feminism to critical legal studies (Black Macho to The Alchemy of Race and Rights).

269. Aesthetics. Critical examination of some of the major problems in aesthetics and consideration of the historical roots from which they have evolved. Same as PHL 241. (Fall)

Asian

222. Chinese Painting. Masterpieces of Chinese painting studied in their historic contexts and in their relation to developing theories of art and connoisseurship. (Fall)

223. Shrine and Image. Indian religious architecture, its sculptured imagery and ritual use, investigated with respect to the spiritual ideals collectively expressed. Same as REL 222. (Fall)

224. The Arts of Japan. A survey of the major arts of Japan in their historical sequence, with special emphasis upon the development of a national style. (Spring)
226. The Arts of Buddhist Asia. The development of Buddhist art is traced from its origins in India to its eastern-most manifestations in Japan and Indonesia. (Fall)

227. Ukiyo-E: Popular Art of Pre-Modern Japan. The popular art of the Tokugawa period, chiefly wood-block prints, studied within the context of the social history of pre-modern Japan. (Spring)

228. The Divine Lover: Sexual Themes in Indian Art. The myth of Krishna, the archetypal lover, is analyzed with reference to the continuing traditions of sexual imagery in Indian religious art. Same as REL 238.

MEDIEVAL

210. Medieval Art and Architecture. A historical survey of painting, sculpture, and architecture from the end of the Roman Empire to the age of Gothic cathedrals, with particular attention given to the relationship between monuments and their historical and ideological contexts.

212. Early Christian and Byzantine Art. The art and architecture of the period of Constantine in the West and Byzantine art centered in Constantinople to 1453. (Spring)

213. Romanesque Art and Architecture. A study of the origins and regional manifestations of Romanesque art in the eleventh and twelfth centuries. Same as REL 205. (Fall)

214. Gothic Art and Architecture. Gothic art is studied from its origins in northern France to its development throughout Europe. Same as REL 206. (Spring)

215. English Art. A survey of the art of the Middle Ages in England from the end of Roman occupation to the Tudor period. (Spring)

RENAISSANCE AND BAROQUE

232. Italian Renaissance Art. A study of the architecture, sculpture, painting, and art historical concepts of the period from 1400-1550 in Italy.

233. High Renaissance. The art of the High Renaissance and Mannerist period in Florence, Rome, and Venice 1500-1600. (Fall)

235. Renaissance Art in the North. A thematic study of Northern Renaissance art from 1300-1600, with a focus on historical context and issues of interpretation. (Spring)

286. Baroque Painting and Sculpture. A survey of northern and southern baroque art during the seventeenth century. (Fall)

MODERN

261. The Age of Revolution: Early Nineteenth Century Art. The rise of modern art in Europe, especially France, from the late eighteenth century to about 1860. (Spring)

262. Impressionism and Post-Impressionism. Deals with major movements in European art, especially in France, from 1860 to 1900. Impressionism, Post-Impressionism, and Symbolism are discussed.

263. Twentieth-Century Art. Major directions in twentieth-century art from Cubism to the present in Europe and America. (Fall)


270. American Art. A survey of painting, sculpture, and architecture from the nineteenth through the twentieth century.

275. American Architecture. A historical survey of architecture in America, from the earliest colonial settlements - Spanish, French, Dutch, and English - through the eighteenth and nineteenth centuries and the beginning of the twentieth, ending ca. 1915. Field trip. (Fall)

276. Twentieth-Century Architecture. A study of twentieth-century architecture, concentrating on America but including international influences and covering traditional, modern, and post-modern developments. Field trip. (Spring)

283. Photography and Painting: Representation in Theory and Practice. The evolution of a way of seeing in the Western world that led to and developed from the invention of photography. Concentration on the visual image and its relation to form and content in contemporary pictures in other media. (Fall)

355. Impressionism. An investigation of artistic biography as an interpretive model with reference to artists in France 1860-1900. (Fall)

PHOTOGRAPHY AND FILM

111. Introduction to the History of Film. The development of motion pictures from 1895 to the present. Same as ENG 131.

112. Introduction to the Art of Film. The primary visual, aural, and narrative structures and conventions by which motion pictures create and comment upon significant human experience. Same as ENG 132.

273. The Art of Motion Pictures. The motion picture presented and analyzed as a distinctive form of visual and dramatic art. The expressiveness and communication of visual and other information are explored through selected examples of the moving image. Same as ENG 250/450.

284. The Great Divide, Picture or Document: Photography 1880-1930. Exploration of American and European styles and practitioners against social, historical, and art historical backgrounds. AH 283 is strongly recommended as a foundation, but students with a course in modern art will be accepted.


PHOTOGRAPHY

287. The Photograph: Selected Topics. A study of specific problems in photography with changing focus.


INDEPENDENT PROGRAMS OF STUDY

391. Independent Study in Art History. Independent study under faculty guidance of a limited field of art history or individual study on a single topic at an advanced level under the guidance of a member of the art history faculty.

393. Senior Project (see "Requirements for Honors in Art History" above).


STUDIO ARTS (SA)

Studio courses are open to all students and, unless otherwise noted, are scheduled for six hours each week.

BEGINNING COURSES

The four beginning courses are part of the requirements for concentration in studio arts, and at least two should be taken prior to the junior year. Sections are limited in size and are closed to seniors: these courses are normally offered every semester and may be taken in any order.

111. Drawing I. An introduction to drawing with an emphasis on direct observation. Through the use of studio work, slides, and discussion, the student will explore a variety of approaches to drawing, using historical and contemporary concepts. Individual as well as group critiques are conducted during class period. (Fall and Spring)

112. Painting I. The beginning studio in painting and related media emphasizes directed experience with practical processes and compositional ideas. Selection of basic materials and preparation is demonstrated and discussed as a participatory experience. Initial paintings explore color application. Through a series of specific proposals, students are encouraged to explore structure with an emphasis on recognizing issues of individual investigation. Group discussions and individual meetings are on a weekly basis. (Fall and Spring)

131. Sculpture I. This course is designed to introduce the student to some basic elements of sculptural language. Each assignment, building upon the previous, helps one acquire a better understanding of such things as: space, scale, texture, form, composition, and content. The projects, whose concerns vary from traditional representation to the conceptual, are a communication of this understanding. The exploration of various techniques and media, including clay, plaster, and wood, leads to a mature level of expression. (Fall and Spring)

141. Photography I. Using black-and-white photographic materials, the beginning studio in photography is designed to develop an awareness of the potential of photography as a creative means of expression. Through a series of formal problems, students are encouraged to explore the potential of photography
as a visual language. Students are expected to provide their own camera. Basic camera operation and darkroom procedures are covered.

UPPER-LEVEL COURSES

It is recommended that two 100-level studio courses and one course in art history be taken prior to or concurrently with a 200-level course.

In courses numbered 200 and higher, some research may be assigned, however, students are expected to develop their own projects. Individual and group discussions of student work, gallery visits, presentations by guest artists, slide talks, and readings are regular features of these courses. Classes are normally limited to 15 students.

212. Drawing II. As a continuation of SA1 Drawing I, this course is a further exploration of the elements of drawing; the assignments are a communication of their understanding. Artistic language, like verbal language, is a learned function of expression — your drawings are considered expressive documents of both idea and sight. There are frequent lectures and discussions on the concepts and techniques that are being explored. Individual and group critiques occur throughout the semester. Studio work outside of the class is expected as well as the completion of several readings and a minimal amount of writing. (Fall and Spring)

222. Painting and Related Media II. The intermediate studio includes structured proposals to further develop independent research and production. Students are expected to explore the broadest examination of painting and related media. (Fall and Spring)

233–244. Painting and Related Media III and IV. The evolving continuation of painting with serious emphasis on independent proposals, research, and production. Again, the broadest examination of painting and related media is expected. (Fall and Spring)

252. Sculpture II, III, and IV. Projects similar to SA 131, but of an advanced nature. According to their development, students are encouraged to establish their own projects as the term progresses. Students are directed to readings in the Art Library and in contemporary journals according to their interests. At least six hours of studio work (often more) will be expected outside of class per week. The material taught depends on the ability and special interest of the group and leads to a mature level of presentation of expression. (Fall and Spring)

242. Photography II. An intensive course with emphasis placed on each student’s individual investigation of photography as a contemporary means of visual expression. Students can expect four assigned projects and also are responsible for exploring in depth a subject-proposal of their own choice in consultation with the instructor. (Fall and Spring)

243–244. Photography III and IV. An intensive advanced-level course with continued emphasis placed upon each student’s individual investigation of photography as a contemporary means of visual expression. Students may elect to spend the entire semester working on one visual problem. (Fall and Spring)

251. Introduction to Filmmaking. The course provides the student, through discussion, lecture, viewing of films, and practical use and application of the materials and tools of filmmaking, a working knowledge of Super-8 film techniques: film planning and scripting, shooting styles, lighting, editing, sound systems (synchronous and nonsynchronous) and film projection formats. (Fall and Spring)

252. Filmmaking II. A course designed for students who have had at least basic experience with filmmaking and are interested in extending the development of their filmmaking abilities. Major focus of the course is a commitment on the part of the student to work independently on a film project they initiate through guidance and instruction of the teacher. (Fall and Spring)

262. Markings, Methods, and Materials. An interdisciplinary course exploring the boundaries of traditional studio materials, techniques, and tools with an emphasis on process and evaluation. Elements of design and principles of visual organization, as well as meaning and concept, are addressed through various studio methods, assignments, and the student’s independent creative processes. (Spring)

ADVANCED STUDIO

The Advanced Studio course is the final requirement for painting, photography, and sculpture concentrators, and the course is limited to concentrators. Students entering Advanced Studio must have completed a combination of four courses in painting, photography, and sculpture in the 200 series. Students will be expected to bring a number of projects to completion. The courses are offered every semester.

350. Advanced Studio I.

355. Advanced Studio II.

360. Advanced Studio III.

INDEPENDENT PROGRAMS OF STUDY

391. Independent Study in Studio Art. Individual studio work at an advanced level and under the guidance of a member of the studio arts faculty.

393. Senior Project (see “Requirements for Honors in Studio Art” above).

ASIAN STUDIES

COMMITTEE ON ASIAN STUDIES

Anthony T. Carter, Ph.D. (Cambridge)  
Professor of Anthropology

Diran K. Dohanian, Ph.D. (Harvard)  
Professor of Art History

William B. Hauser, Ph.D. (Yale)  
Professor of History

Thomas P. Gibson, Ph.D. (London School of Economics)  
Associate Professor of Anthropology

David Pollack, Ph.D. (California, Berkeley)  
Associate Professor of Japanese and of Chinese

Douglas R. Brooks, Ph.D. (Harvard)  
Assistant Professor of Religion and Chair of the Committee

Yoshihasa Kitagawa, Ph.D. (Massachusetts, Amherst)  
Assistant Professor of Japanese

Melanie Manion, Ph.D. (Michigan)  
Assistant Professor of Political Science

Datta S. Kharbas, M.A. (Michigan)  
Head, Asia Library

ASSOCIATES

*Robert Compton, Ph.D. (Stanford)  
Associate, Asia Library

Henry P. French, Jr., Ed D. (Rochester)  
Professor of History, Monroe Community College

The program uses teaching assistants in large lecture courses and language offerings.

*Part-time
ASIAN STUDIES CERTIFICATE PROGRAM

The Asian Studies Certificate Program at the University of Rochester is designed to permit students concentrating in the social sciences and humanities to develop knowledge of Asian cultures and languages as a complement to their disciplinary concentration. Those interested in the program must satisfy the requirements in their major field and, in addition, submit a program that includes at least the following:

- Six courses from those listed under the heading “Primary Courses in Asian Studies,” with an understanding that no more than two will be taken in any one department.
- Four additional courses from any list below.

In addition:

- None of the courses used toward the certificate may be taken satisfactory-fail.
- Students must earn an overall grade-point average of at least 2.0 in courses submitted for the program.

The Asian Studies Certificate Program is administered through the College Center for Academic Support. Students who plan to enroll in the program should pick up an application in the Center office in 312 Lattimore Hall and then consult one of the members of the Asian Studies Committee, who act as faculty advisors for the program. Once the application is filled out and is signed by the faculty advisor, it should be returned to the College Center for Academic Support.

Upon graduation, students successfully completing the Asian Studies Program will receive a Certificate in Asian Studies.

A. PRIMARY COURSES IN ASIAN STUDIES

ANTHROPOLOGY

ANT 240. Southeast Asian Ideologies.
ANT 249. The Civilizations of South Asia.

ARTS AND ART HISTORY

AH 103. Introduction to the Art of India and the Far East.
AH 222. Chinese Painting.
AH 223. Shrine and Image.
AH 224. The Arts of Japan.
AH 228. The Divine Lover: Sexual Themes in Indian Art.

FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS

LIT 178. Traditional Chinese.
LIT 240. Traditional Japanese Literature.

HISTORY AND GEOGRAPHY

HIS 117. Traditional Japanese Culture.
HIS 178. Traditional China.
HIS 276. Japan and Pearl Harbor.
HIS 277. Modern Japan.
HIS 286. Film Images of the Pacific War.
HIS 296. Women in East Asia: Japan, China, Korea.
HIS 378. Tokugawa Japan.

POLITICAL SCIENCE


RELIGION AND CLASSICS

REL 103. The Asian Search for Self.
REL 106. From Confucius to Zen.
REL 178. Traditional China.
REL 234. Buddhism: The Compassionate Teachings of the Middle Way.
REL 241. Hindu Mythology.
REL 244. Myth and Ritual in Epic Hinduism.
REL 251. Hindu Goddesses and Women.
REL 254. The Buddha Legend and Buddhist Philosophy.
REL 255. Seminar in Zen Buddhism.

B. ASIAN LANGUAGE COURSES

FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS

Any offering from Chinese and Japanese languages.

C. ALLIED ASIAN COURSES

ANTHROPOLOGY

ANT 266. Comparative Political Economy.

COLLEGE OF ARTS AND SCIENCE

CAS 150. GO= Game and Culture.

HISTORY

HIS 202. The Third World

POLITICAL SCIENCE

PSC 278. The War in Vietnam.

ASTRONOMY

(see Physics and Astronomy, page 109)

UNDERGRADUATE PROGRAM IN BIOLOGY AND MEDICINE

COMMITTEE OF TRACK COORDINATORS

Thomas T. Bannister, Ph.D. (Illinois) Professor of Biology and of Biophysics; B.A. in Biology Track Coordinator

Stanley M. Hattman, Ph.D. (M.I.T.) Professor of Biology and Associate Chair, Biology Department; Director, Undergraduate Program in Biology and Medicine

Carol Kellogg, Ph.D. (Rochester) Professor of Psychology and Associate Professor of Pharmacology; Neuroscience Track Coordinator

Robert E. Marquis, Ph.D. (Michigan) Professor of Microbiology and Microbiology Track Coordinator

Thomas Eickbush, Ph.D. (Johns Hopkins) Associate Professor of Biology and Cellular and Developmental Biology Track Coordinator

David C. Hinkle, Ph.D. (California, Berkeley) Associate Professor of Biology and Molecular Genetics Track Coordinator

Eric M. Phizicky, Ph.D. (Cornell) Associate Professor of Biochemistry and Co-Track Coordinator of Biochemistry

John Wertten, Ph.D. (Utah) Associate Professor of Biology; Ecology and Evolutionary Biology Track Coordinator

David J. Culp, Ph.D. (California, Berkeley) Assistant Professor of Dental Research and of Biochemistry and Co-Track Coordinator of Biochemistry

Undergraduate education in the biological sciences at the University of Rochester involves an unusually close collaboration between the College of Arts and Science and the School of Medicine and Dentistry.

Undergraduates may choose to obtain either a B.A. degree in biology or a B.S. degree in biological sciences with specialization in one of six areas: biochemistry, cell and developmental biology, ecology and evolutionary biology, microbiology, molecular genetics, and neuroscience. In addition, students may receive a Certificate in Biotechnology in conjunction with a degree upon completion of a prescribed set of courses.

Each of the curricula described below constitutes strong preparation for graduate or professional study. The combined curricula of the Undergraduate Program in Biology and Medicine offer more than 40 lecture and laboratory courses and additional seminars in
specialized topics. In addition to formal coursework, the large number of faculty involved in the Program provides an exceptional number and diversity of independent research opportunities.

**PLANNING A CURRICULUM**

One particular advantage of the Program is that the student need not make a premature choice among the degrees offered. The B.A. and B.S. degrees also require a common core of courses: BIO 110 and BIO 111, Principles of Biology I & II; and BIO 121, Genetics. These core courses are to be taken in sequence. The student may then sample several introductory courses in the specific areas of the six B.S. curricula; these courses may be used as part of a B.S. program (as required or as diversification courses) or may become part of a B.A. curriculum. In addition, most of the courses required in the allied fields (chemistry, mathematics, and physics) are the same for all of the degrees offered. Students interested in pursuing a concentration in biological sciences are urged to begin fulfilling the chemistry requirements in the freshman year. A typical program for the first two years that would prepare a student for any of the curricula described below is:

### Freshman Year

**Fall**
- BIO 110
- CHM 103 or 105
- Elective (English, foreign language)
- Elective

**Spring**
- BIO 111
- MTH 141 or 161
- CHM 104 or 106
- Elective

### Sophomore Year

**Fall**
- BIO 121
- CHM 203 or 205
- MTH 142 or 162
- Elective

**Spring**
- CHM 204 or 206
- Biology elective
- Elective
- Elective

### B.A. in Biology

The B.A. curriculum is intended to provide the student with a well-rounded introduction to the major areas of biology. This program offers the maximum freedom of course selection since among the eight biology courses necessary to earn the degree, only the three core courses are specifically required. (See page 49.)

### B.S. in Biological Sciences: Biochemistry

Basic concepts of metabolism, protein structure and function, and experimental techniques are covered. In the senior year a wide variety of optional courses is offered allowing specialization in enzymology, membrane biochemistry, DNA, and RNA structure formation. (See page 48.)

### B.S. in Biological Sciences: Cell and Developmental Biology

Covers the analysis of the structure and function of cells, the organization and interaction of cells and tissues, and the processes of development responsible for cell and tissue differentiation and production of the adult form. Emphasis is placed on the molecular bases for cellular and developmental processes. (See page 50.)

**B.S. in Biological Sciences: Ecology and Evolutionary Biology**

Ecology, animal behavior, population genetics, and molecular evolution. While the descriptive aspects of these subjects receive adequate treatment, the major emphasis in all courses is on the dynamic processes influencing organisms and populations in nature. The subject matter presented concentrates on quantitative analyses, both experimental and theoretical. (See page 50.)

### B.S. in Biological Sciences: Microbiology

The introductory course considers how microorganisms are adapted to their environment. In advanced courses, emphasis is placed on the molecular functioning of microorganisms, covering such topics as microbial physiology, microbial genetics, industrial microbiology, immunology, virology, and pathogenic microbiology. (See page 53.)

### B.S. in Biological Sciences: Molecular Genetics

Covers chromosome structure, the molecular mechanisms of DNA replication, DNA mutations and repair, DNA recombination, and the regulation of gene expression. Emphasis is placed on experimental approaches, including recombinant DNA technology. (See page 50.)

### B.S. in Biological Sciences: Neuroscience

Neuroscience, which is an interdisciplinary pursuit, deals with the mechanisms by which nervous systems mediate behavior. A combination of coursework and laboratory experience gives students a firm understanding of brain function from the molecular to the behavioral levels. Topics covered include biochemical, anatomical, physiological, and medical aspects of neurobiology. (See page 55.)

### Certificate in Biotechnology

The program for the Certificate in Biotechnology is designed to give students the specialized background needed for entry into biotechnology jobs or for advanced study in the field. Requirements for the certificate complement the B.A. or B.S. tracks in biological science; students in other degree programs may also be eligible. The certificate is administered through the Undergraduate Program in Biology and Medicine Office. Interested students should contact this office for further information.

The Certificate in Biotechnology will be awarded upon graduation to those who have successfully completed the following requirements: BIO 110, 111, 121, and 150; an introductory computer course, e.g., CSC 181; MBI 445, Industrial Microbiology; two laboratory courses chosen from the following: MBI 221, Microbiology Laboratory, BIO 268, Molecular Genetics Laboratory (prerequisite BIO 202); and either BIO 228, Cell and Developmental Biology Laboratory (prerequisite BIO 210 or BIO 226), or BCH 208, Biochemistry Laboratory (prerequisite IND 401).

### Independent Research, Degrees with Distinction, and Course Offerings

The facts, theories, and principles taught in our formal courses ultimately derive from research in the laboratory or field. Students are encouraged to experience the challenges, successes, frustrations, and excitement of research by arranging independent research programs in the laboratories of individual members of the faculty in the Undergraduate Program in Biology and Medicine. The diversity of the faculty's research interests gives students the opportunity to select projects from a wide variety of fields. Work in a laboratory provides an inside view of science and scientists that cannot be gained through lectures or reading and is particularly valuable for undergraduates who contemplate careers in research. Occasionally, students' contributions to research are incorporated into published journal articles, and the students are listed as coauthors of these papers.

Independent research may be arranged for formal course credit (courses numbered 395). These courses are generally taken in the junior or senior year after the student has gained a solid background of courses in the biological sciences and the allied fields. Lists of available research opportunities for undergraduates with faculty members in the biomedical sciences are kept in the Program office for reference. Each semester 30 to 40 students take independent research courses with faculty members in the Program. Research projects can also be conducted during the summer through the Kiewiet Summer Research Fellowships, awarded on a competitive basis to students in Program tracks.

Students who have demonstrated ability and initiative in an independent research project may be recommended for a degree with distinction or high distinction in research after successful completion and defense of a written dissertation. The deadline for applying for a degree with distinction in research is February 15 of the senior year. However, it is necessary to plan the research project well beforehand. Specific information is available from the Undergraduate Program in Biology and Medicine Office (402F Hutchison Hall).
Several departments in the biomedical sciences at the University of Rochester participate in the Undergraduate Program in Biology and Medicine by offering courses for undergraduates. These departments include: biochemistry, biology, biophysics, microbiology and immunology, neurobiology and anatomy, pharmacology, physiology, psychology.

**BIOCHEMISTRY**

*Leo G. Abood, Ph.D. (Chicago)  Professor of Pharmacology and of Biochemistry*
Robert A. Bambara, Ph.D. (Cornell)
Professor of Oncology in Biochemistry and in Microbiology and Immunology

**Thomas R. Broker, Ph.D. (Stanford)  Professor of Biochemistry and of Oncology**

**Louise T. Chow, Ph.D. (California Institute of Technology)  Professor of Biochemistry and of Oncology**

Russell Helf, Ph.D. (Rutgers)  Professor of Biochemistry and of Oncology

George A. Kimmich, Ph.D. (Pennsylvania)  Professor of Biochemistry and of Biophysics; Senior Associate Dean for Graduate Studies, School of Medicine and Dentistry

*Guido V. Marinietti, Ph.D. (Rochester)  Professor of Biochemistry*

George L. McLendon, Ph.D. (Texas A&M)
Tracy H. Harris  Professor of Chemistry and of Biochemistry

Terry Platt, Ph.D. (Harvard)  Professor of Biochemistry and of Biology

Fred Sherman, Ph.D. (California, Berkeley)  Professor of Biochemistry and Chair of the Department; Professor of Biophysics

Alan E. Senior, Ph.D., D.Sc. (University of Newcastle-Upon-Tyne, England)  Professor of Biochemistry

Lawrence A. Tabak, Ph.D. (SUNY, Buffalo)  Professor of Dental Research and of Biochemistry

Donald A. Young, M.D. (Yale)  Professor of Medicine, of Biophysics, and of Biochemistry

Selwyn Zigan, Ph.D. (Rutgers)  Professor of Ophthalmology and of Biochemistry

David J. Culp, Ph.D. (California, Berkeley)  Associate Professor of Dental Research and of Biochemistry, Assistant Professor of Pharmacology, and Co-Track Coordinator of Biochemistry

Eric M. Phizicky, Ph.D. (Cornell)  Associate Professor of Biochemistry and Co-Track Coordinator of Biochemistry

Sayeda B. Zain, Ph.D. (Glasgow University)  Associate Professor of Oncology in Biochemistry

*Richard M. Bayer, Ph.D. (Rutgers)  Assistant Professor at Rochester General Hospital and of Biochemistry*

Wen-Gang Chou, Ph.D. (St. Louis University)  Assistant Professor of Radiation Oncology and of Biochemistry

Mark E. Dumont, Ph.D. (Johns Hopkins)  Assistant Professor of Biochemistry

John W. Ludlow, Ph.D. (Kansas State University)  Assistant Professor of Oncology in Biochemistry

Leon L. Miller, M.D. (Rochester)  Professor Emeritus of Biophysics, of Medicine, and of Biochemistry

**Committee for B.S. Track in Biochemistry**

David J. Culp, Ph.D. (California, Berkeley)  Associate Professor of Dental Research and of Biochemistry, Assistant Professor of Pharmacology, and Co-Track Coordinator of Biochemistry

Eric M. Phizicky, Ph.D. (Cornell)  Associate Professor of Biochemistry and Co-Track Coordinator of Biochemistry

**Requirements for Biochemistry**

- Introductory Courses — BIO 110, 111, 150.
  Advanced Placement: Students with a score of 4 or 5 on the biology AP exam may elect to receive 4 hours of credit and place out of BIO 110 and BIO 111; in that case, they must take one additional elective/diversification course. For other options, students should consult with a biochemistry department advisor.

- Biochemistry Courses — BCH 208 lab, 401, 402 (it is recommended that the lab be taken in the junior year).

- Advanced Courses — Three courses from the following list (at least one must be chosen from each of Groups A and B):
  - Group A
    - BIO 220. Structure and Function of Cell Organelles
    - BIO 236. Advanced Developmental Biology
    - BIO/IND 443. Eukaryotic Genome Organization and Expression
  - Group B
    - BCH 216. Structure and Regulation of Enzymes
    - BCH 312. Structure and Function of Macromolecules
    - IND 425. Membrane Biochemistry and Biophysics
    - CHM 252. Physical Chemistry II
    - CHM 437. Bioorganic Chemistry
  - Group C
    - BCH 395. Independent Research

- Elective/Diversification — Two courses from outside the biochemistry curriculum. They are to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and be approved by the Track Coordinator.

**NOTE:** Students who have received AP credit (and did not take BIO 110 or BIO 111) are required to take three elective/diversification courses.

**Allied Fields**

1. A calculus sequence (MTH 141, 142 or MTH 161, 162) and a course in either differential equations (MTH 163), or statistics (MTH 201 or 212), or computer science (CSC 181 or EE 171). (STT 211, CSC 108, and CSC 110 are not acceptable.)

2. Four semesters of chemistry (two general and two organic courses) with lab.

3. Two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab.

**Courses of Instruction**

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

208. Biochemistry Laboratory. A laboratory course designed to introduce students to the theory and practice of biochemical, genetic, and molecular techniques. Students gain first-hand experience with state-of-the-art techniques and data analysis through their participation in experiments which emphasize particular assays, methods, or instrumentation. Topics covered are measurements of volume and mass and calculations of concentration, laboratory safety, spectrophotometry, setup of enzyme reactions and measurement of kinetic parameters; fractionation of proteins; molecular sieve and ion exchange chromatography, SDS polyacrylamide gel electrophoresis, Western blotting, peptide mapping; DNA isolation; restriction fragment analysis; oligonucleotide-directed mutagenesis, polymerase chain reaction, genetic selection, DNA sequencing; RNA isolation, in vitro transcription; and primer extension analysis. Two laboratory periods per week with lecture. Prerequisite: BCH 401. (Spring)

216. The Function and Regulation of Enzymes. This course provides a broad survey of the biochemical functions of enzymatic proteins, with special emphasis on proteolytic enzymes and enzyme systems of biological and medical significance. The material covered is grouped into several general sections: regulation of enzyme activity; multi-enzyme complexes; triggered enzyme systems; and other aspects of enzyme function and regulation. Readings of current literature supplement the lecture material. Prerequisite: BCH 401 or the equivalent. (Spring)
Elective
Fall
CHM 103 or 104
CHM 105 or 106
MTH 161
MTH 162
BIO 110
BIO 111
Elective
Elective

Second Year
CHM 203 or 204
CHM 205 or 206
BIO 150
Elective
Elective

BIOLOGY

Robert C. Angster, Ph.D. (Johns Hopkins) Professor of Biology and of Pediatrics
Thomas T. Bannister, Ph.D. (Illinois) Professor of Biology and of Biophysics
Martin A. Gorovsky, Ph.D. (Chicago) Professor of Biology, Rush Rhees Professor, and Chair of the Department
Bart T. Hall, Ph.D. (Washington) Professor of Biology
Stanley M. Hattman, Ph.D. (M.I.T) Professor of Biology
John J. Jaenike, Ph.D. (Princeton) Professor of Biology
Lasse Lindahl, Ph.D. (Copenhagen) Professor of Biology
Joanna B. Olmsted, Ph.D. (Yale) Professor of Biology
Terry Platt, Ph.D. (Harvard) Professor of Biochemistry and of Biology
Chee hep Binayati, Ph.D. (Princeton) Associate Professor of Biology
Thomas Eickbush, Ph.D. (Johns Hopkins) Associate Professor of Biology
David C. Hinkle, Ph.D. (California, Berkeley) Associate Professor of Biology
John H. Werren, Ph.D. (Utah) Associate Professor of Biology
Eldridge S. Adams, Ph.D. (California, Berkeley) James P. Wilmot Assistant Professor of Biology
Robert J. Fleming, Ph.D. (Brandeis) Assistant Professor of Biology
David S. Goldfarb, Ph.D. (California, Davis) Assistant Professor of Biology
Elizabeth J. Grayhack, Ph.D. (Cornell) Assistant Professor of Biology
Howard Ochman, Ph.D. (Rochester) Assistant Professor of Biology
H. Allen Orr, Ph.D. (Chicago) Assistant Professor of Biology
Animesh Ray, Ph.D. (Monash University, Melbourne, Australia) Assistant Professor of Biology

Susan Zusman, Ph.D. (Princeton) Assistant Professor of Biology
George E. Hoch, Ph.D. (Wisconsin) Professor Emeritus of Biology and Senior Faculty Associate
Jerome S. Kaye, Ph.D. (Columbia) Professor Emeritus of Biology and Senior Faculty Associate
William B. Muchmore, Ph.D. (Washington University) Professor Emeritus of Biology
Uzi Nut, Ph.D. (California, Berkeley) Professor Emeritus of Biology and Senior Faculty Associate

Approximately 48 graduate students, in partial fulfillment of requirements for the Ph.D. degree, assist in the instructional program as recitation leaders and laboratory teaching assistants.

The Department of Biology administers curricula leading to four of the seven undergraduate degrees offered through the Undergraduate Program in Biology and Medicine: (1) B.A. in biology, (2) B.S. in biological sciences: cell and developmental biology, (3) B.S. in biological sciences: molecular genetics, and (4) B.S. in biological sciences: ecology and evolutionary biology. A minor in biology is also available. (The general structure of the Undergraduate Program in Biology and Medicine is described on page 45.) A B.S. in biology-geology (see page 82) is administered by the Department of Geological Sciences.

The B.A. curriculum is intended to provide the student with a well-rounded introduction to the major areas of biology.

The B.S. curriculum stresses theoretical and experimental approaches and the development of expertise in a focused field of biology, including analysis of results in the current scientific literature. Breadth of background in biology is achieved through the three or four biology introductory courses and the one or two additional biology diversification courses (depending on the concentration) selected from outside the area of specialization.

PLANNING A CURRICULUM
See Undergraduate Program in Biology and Medicine, page 46.

B.A. IN BIOLOGY

The requirements for the B.A. in biology are:

- Introductory Courses—BIO 110, 111, and 121.

Advanced Placement: Students with a score of 4 or 5 on the Biology AP exam may elect to receive 4 hours of college credit and place out of BIO 110 and/or BIO 111; students who choose to place out of both courses must take one additional elective/diversification course. For other options, students should consult with a biology department advisor.
The requirements for the B.S. in cell and developmental biology are:

- **Introductory Courses**—BIO 110, 111, 121, and 150.
- **Advanced Placement**: Students with a score of 4 or 5 on the Biology AP exam may elect to receive 4 hours of college credit and place out of BIO 110 and/or BIO 111; students who choose to place out of both courses must take one additional elective/diversification course. For other options, students should consult with a biology department advisor.
- **Cell and Developmental Biology Courses**—BIO 210, 226, and 228 lab (it is recommended that the lab be taken in the junior year).
- **Advanced Courses**—Two courses from the following list: BIO 220, 236, 443, and MBI 473.
- **Elective/Diversification**—One course from outside the cell and developmental biology curriculum. It is to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and be approved by the Track Coordinator.
- **Recommended Courses**—BIO 516, Seminar in Cell and Development (a one-credit, non-required course open to concentrators with permission of the instructor); and IND 395, Independent Research (this does not count as an elective/diversification course).
- **Allied Fields**

1. A calculus sequence (MTH 141, 142 or MTH 161, 162).
2. Four semesters of chemistry (two general and two organic courses) with lab.
3. Two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab.

**B.S. IN BIOLOGICAL SCIENCES: CELL AND DEVELOPMENTAL BIOLOGY**

Cell biology is the study of the structure, composition, and function of cells and their component parts. Cell biologists seek to elucidate the common features of different kinds of cells as well as the unique aspects of structure and physiology that confer special functions on different types of cells in a tissue, organ, or organism. The fields of cell biology and developmental biology are closely related. Developmental biology deals with the processes involved in the production of an adult organism from a fertilized egg. A major facet of developmental biology is the study of the mechanisms by which differentiated cells achieve and maintain their special properties. Modern investigations in both cell and developmental biology are extensively integrated with the theories, results, and techniques of genetics, molecular biology, and biochemistry.
The requirements for the B.S. in molecular genetics are:

- Introductory Courses—BIO 110, 111, 121, and 150.

Advanced Placement: Students with a score of 4 or 5 on the Biology AP exam may elect to receive 4 hours of college credit and place out of BIO 110 and/or BIO 111; students who choose to place out of both courses must take one additional elective/diversification course.

- Molecular Genetics Courses—BIO 202 and 268 lab (it is recommended that the lab be taken in the junior year).

- Advanced Courses—Two courses from the following list: BIO 443, 451, and MBI 456.

- Elective/Diversification: Two courses from outside the molecular genetics curriculum. They are to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and be approved by the Track Coordinator.

NOTE: Students who have received AP credit and did not take BIO 110 and BIO 111 are required to take a total of three elective/diversification courses.

- Allied Fields

1. A calculus sequence (MTH 141, 142 or MTH 161, 162) and a course in either differential equations (MTH 163), or statistics (STT 201 or 212), or computer science (CSC 181 or EE 171).

NOTE: STT 211, CSC 108, and CSC 110 are not acceptable.

2. Four semesters of chemistry (two general and two organic courses) with lab.

3. Two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab.

4. Two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab.

5. Two and one-half hours of lecture and one recitation per week. Not for students majoring (or minoring) in biology; does not carry major or minor credit. (Fall)

6. Two and one-half hours of lecture and one recitation per week. Not for students majoring (or minoring) in biology; does not carry major or minor credit. (Fall)

MINOR IN BIOLOGY

The requirements for a minor in biology are:

- Introductory Courses—BIO 110, 111, and 121.

Advanced Placement: Students with a score of 4 or 5 on the Biology AP exam may elect to receive 4 hours of college credit and place out of BIO 110 and/or BIO 111; students who choose to place out of both courses must take one additional elective/diversification course.

- Two courses in chemistry—CHM 103 and 104* with lab (CHM 103L and 104L).

- One elective course to be chosen from BIO 130, 150, 202, 203, 204, 205, 210, 226, 248, 260, 263, NSC 201, and MBI 220.

- One 200-level laboratory (to be chosen from BIO 200, 225, 228, 268, NSC 203, MBI 221, and BCH 208); or two advanced lecture-laboratory courses such as BIO 203 and BIO 204.

NOTE: This combination also satisfies the elective course requirement.

No independent study or research course (391 or 395) may be counted toward the minor in biology. Approval of courses chosen for the minor is granted by the Associate Chair of the Department of Biology, who will also serve as the student’s advisor.

INDEPENDENT RESEARCH AND DEGREES WITH DISTINCTION

See Undergraduate Program in Biology and Medicine, page 46.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. Introduction to Modern Biology. A lecture course covering the general topics of cell biology, genetics, human physiology, ecology, and evolution. Selected special topics include cancer, recombinant DNA technology, human evolution, and AIDS. Two and one-half hours of lecture and one recitation per week. Not for students majoring (or minoring) in biology; does not carry major or minor credit. (Fall)

110. Principles of Biology I. A lecture course required of all majors and minors in biology. Major topics include: biochemistry, cellular structures, growth and reproduction, fundamentals of genetics and molecular biology (structure, synthesis, and functioning of DNA, RNA, and proteins), viruses. Three hours of lecture and one recitation per week. No prerequisites. (Fall)

*Additional courses in the allied fields of chemistry, physics, and mathematics may be required to meet admissions requirements for medical school.
111. Principles of Biology II. The second semester of the introductory sequence (required of all majors and minors in biology). Major topics include: plant and animal physiology, differentiation, reproduction, cellular physiology of various organ systems, natural selection and speciation, diversity, population genetics and ecology, behavior and human evolution. Three hours of lecture and one recitation per week. Prerequisite: BIO 110. (Spring)

121. Genetics. This course provides an introduction to classical and molecular genetics. Major topics include transfer and mapping of genes in eukaryotes and prokaryotes, genetic recombination, the genetic code, structure of the gene, mRNA transcription and translation, and regulation of gene expression. Three hours of lecture and one recitation per week. Prerequisites: BIO 110, 111, and concurrent registration in CHM 203 or 205. (Fall, not generally open to freshmen)

130. General Botany I. Classification, morphology, physiology, and ecology of the major plant groups. Three hours of lecture and one three-hour laboratory per week. Half-day field trips on Saturdays: four in September, one in October, and one in November. No prerequisites. (Fall)

150. Biochemistry. This is an introductory course in biochemistry. The topics covered include: protein structure and function, enzyme kinetics and mechanisms, intermediary metabolism and control, membrane structure and function, energy transduction, and the structure of nucleic acids. Selected biochemical methods and experimental results are discussed. Three hours of lecture and one recitation per week. Prerequisites: a semester of organic chemistry or comparable familiarity with organic functional groups; BIO 110, BIO 111, and BIO 121 or equivalent are recommended. (Spring)

200. Laboratory in Biology. An introductory survey of methods employed in modern biological research, including field methods, population genetics, cytogenetics, and cellular and molecular biology. Exercises and demonstrations in the laboratory or the field. Two four-hour sessions per week. Prerequisite: BIO 121. (Fall)

202. Molecular Biology. This course deals with the molecular mechanisms of gene replication, gene expression, and the control of gene expression in both prokaryotic and eukaryotic cells. Topics include: enzymatic mechanisms of DNA replication, recombination and repair, transposable elements; DNA transcription; RNA splicing; RNA translation; repressors, activators and attenuators; recombinant DNA, and genetic engineering. Three hours of lecture and one recitation per week. Prerequisite: BIO 121 recommended. (Fall)

203. Mammalian Anatomy. This course deals with the structural and systemic anatomy of animals with special emphasis on human beings. Laboratory includes the dissection of fresh and preserved tissues plus analysis of structures and systems. Three hours of lecture and one three-hour laboratory per week. Prerequisites: BIO 110, 111, and 121 or permission of instructor. (Fall)

204. Mammalian Physiology. This course discusses the function of various mammalian systems with special emphasis on humans. The topics covered include: excitable tissue; respiration; nutrition; reproduction; endocrinology; skeletal, circulatory, and renal systems; and homeostatic mechanisms. Three hours of lecture and one three-hour laboratory per week. Prerequisite: BIO 203 or equivalent or permission of instructor. (Spring)

205. Evolution. Fundamentals of evolution and population biology. Topics include the nature and origins of biological variation, natural selection and its ecological basis, population genetics including selection and drift, speciation, and molecular evolution including molecular phylogeny, molecular clock, and origins of new metabolic functions. Three hours of lecture and one hour of recitation per week. Prerequisites: BIO 111 and 121. (Spring)

210. Cell Biology. A discussion of the structure and biochemical properties of the major cell organelles including mitochondria, the endoplasmic reticulum, ribosomes, the Golgi apparatus, membranes, cytoskeleton, nuclei, and chromosomes. Three hours of lecture per week. Prerequisites: BIO 110 and 111. (Spring)

220. Structure and Function of Cell Organelles. A discussion of the organization and function of cytoplasmic organelles. Lectures and readings are from original research literature, and emphasis is on the analysis and interpretation of experimental results. Three hours of lecture per week. Prerequisites: BIO 121 and BIO 210. (Fall)

225. Laboratory in Ecology and Evolution. Laboratory exercises designed to familiarize students with the methods and approaches of modern evolutionary genetics and population biology. The first half of the course deals initially with computer modeling, then turns to population biology of large organisms and includes exercises on interspecific crosses in Drosophila, statistics and Life Table analyses, polynucleosome studies, and grazing experiments in snails. The second half deals with E. coli and includes experiments in directed evolution, mutant isolation, spontaneous mutation rates, competition for resources, survival, antibiotic resistance in natural populations, and DNA sequence polymorphisms as determined by the isolation and electrophoretic analysis of DNA restriction fragments. Two four-hour laboratories per week. Satisfies the lab requirement for the B.A. and B.S. in biology. Prerequisites: BIO 121 and BIO 226. (Spring)

228. Laboratory in Cell and Developmental Biology. Addresses key cellular and developmental processes using state-of-the-art techniques (including microscopy, spectrophotometry, radioisotopic labeling, electrophoresis, immunocytochemistry, blotting of proteins and nucleic acids, in situ hybridization, nucleic acid isolation, hybridization and autoradiography). The course is designed to provide (i) training in specific methods, data acquisition and analysis, and sampling problems, and (ii) experience in the design and execution of original experiments. Two four-hour labs and one recitation per week. Satisfies the lab requirement for the B.A. and B.S. in biology. Prerequisites: BIO 210 and BIO 226. (BIO 226 can be taken concurrently), or permission of instructor. (Fall)

236. Developmental Genetics. This course centers on genetic approaches to developmental questions. Emphasis is placed on principles of genetic analysis, relative strengths and weaknesses of different techniques as applied to specific problems are presented. Topics include: intracellular communication, cell specification, pattern formation and involvement of extracellular matrix during neurogenesis, morphogenesis, and floral organogenesis. Students examine current literature and participate in active discussions. Three hours of lecture per week. Prerequisites: BIO 121 and BIO 226. (Spring)

248. Environmental Biology. This course investigates the organization and functioning of ecosystems and interactions among species, including the impact of humans past and present. Some of the topics investigated are ancient extinctions, climate and biotic changes in the past 20,000 years, the Hawaiian endemic flora; the earth's carbon cycle and global warming; the functioning of selected land, lake, and ocean ecosystems; chemical ecology of PCB's and pesticides in the Great Lakes; ecological inventories by remote sensing on land and sea; the history of fisheries; ecological disasters; and conservation biology including management and restoration of ecosystems and species. Prerequisite: MTH 142 or MTH 162. (Spring; not open to freshmen or sophomores)

260. Animal Behavior. Examines animal behavior from an ecological and evolutionary perspective. Topics include social organization, mating systems, foraging, aggression,
and animal learning. Students learn quantitative techniques in behavioral biology and conduct independent observations of animal behavior. Three hours of lecture and one recitation per week. Prerequisite: BIO 111 or PSY 141. (Fall)  

263. Ecology. A survey of adaptations to the physical environment, dynamics of natural populations, interactions between species, and community structure. Three hours of lecture and one recitation per week. Prerequisite: BIO 111 and MTH 142 or 161. (Spring)  

265. Molecular Evolution. Deals with various phenomena at the molecular level that are of evolutionary significance. Topics include methods of analyzing DNA and amino acid sequences, rates and patterns of nucleotide substitution, evolution of genetic codes, biases in the usage of synonymous codons, evolution of transposons and retrotransposons, evolution of multigene families, extranuclear genomes, and other current, controversial issues. Two and one-half hours of lecture. Permission of the instructor is required for all students. (Fall)  

268. Laboratory in Molecular Genetics. Experiments with pro- and eukaryotic organisms (Escherichia coli, yeast, and Drosophila), studying fundamental genetic and molecular phenomena. Exercises include isolation of mutants, recombinant DNA and cloning techniques, enzyme assays, gel electrophoresis techniques, restriction nucleic acid cleavage analysis, and Southern and Western hybridizations. Two four-hour laboratories and one recitation per week. Satisfies the laboratory requirement for the B.A. in biology and B.S. in molecular genetics. Prerequisite: BIO 202 or permission of instructor. (Spring)  

391. Independent Study. A special program of reading in advanced aspects of cellular, developmental, or population biology, molecular genetics, plant biology, or bioenergetics may be arranged according to the needs and interests of the individual students. Such courses are normally supervised by any faculty member of the Department of Biology. (Fall and Spring)  

395. Independent Research. A special program of laboratory or field work in advanced aspects of biological science may be arranged with a faculty member of the Department according to the interests of individual students. (Fall and Spring)  

444. Eukaryotic Genome Organization and Expression II. Topics include: transformation of eukaryotic cells, oncogenes, alterations in chromatin structure associated with gene activation, higher order chromatin structure, heterochromatin, DNA amplification, diminution/underreplication and sequence rearrangement, alternative pathways of mRNA transcription and processing, levels of control of mRNA abundance, and control points in the expression of specific genes, transposable elements and retroviruses. Three hours of lecture per week. Prerequisite: BIO 443 or permission of instructor. (Fall)  

451. Advanced Molecular Biology. Molecular mechanisms of maintenance, propagation, and expression of genetic material. Topics include transcription, translation, gene regulation and replication, repair and recombination of DNA. Experimental approaches to the understanding of these processes is emphasized and students read the original research literature. Prerequisite: BIO 265 or permission of instructor. (Fall)  

472. Topics in Evolution. This graduate survey course is designed to cover the areas that are usually included in courses on evolutionary biology, population genetics, and molecular evolution. The emphasis of this course is on the impact of modern genetics on our understanding of evolutionary processes. Prerequisite: BIO 205 or permission of instructor. (Fall)  

473. Survey of Ecology and Evolution. Credit—4 hours. This course explores contemporary topics in ecology and evolutionary biology. The class meets once per week for three hours. Prerequisites: BIO 205 or BIO 263 and permission of instructor. (Spring)  

474. Topics in Ecology. A course for graduate students and advanced undergraduates. Various topics in ecology are reviewed using readings from the primary scientific literature. Three hours of lecture per week. Prerequisites: BIO 205, 263 and permission of instructor. (Spring)  

Other biology courses with numbers of 400 and above, although intended primarily for graduate students, are open to qualified juniors and seniors by permission of the instructor. See Official Bulletin: Graduate Studies.  

MICROBIOLOGY AND IMMUNOLOGY  

Nicholas Cohen, Ph.D. (Rochester) Professor of Microbiology and Immunology and of Psychiatry  
Barbara H. Iglewski, Ph.D. (Pennsylvania State) Professor of Microbiology and Immunology and Chair of the Department  
Wallace J. Iglewski, Ph.D. (Pennsylvania State) Professor of Microbiology and Immunology  
Jack Maniloff, Ph.D. (Yale) Professor of Microbiology and Immunology and of Biophysics  
Robert E. Marquis, Ph.D. (Michigan) Professor of Microbiology and Immunology and of Dental Research  
Marilyn A. Menegus, Ph.D. (Cornell) Professor of Microbiology and Immunology, of Pathology, and of Pediatrics  
David W. Scott, Ph.D. (Yale) Dean’s Professor of Immunology, Professor of Oncology in Microbiology and Immunology  
Patrik Bavoil, Ph.D. (California, Berkeley) Associate Professor of Microbiology and Immunology  
Virginia Clark, Ph.D. (Rochester) Associate Professor of Microbiology and Immunology  
John G. Frelinger, Ph.D. (California Institute of Technology) Associate Professor of Oncology in Microbiology and Immunology  
Richard P. Chillingworth, Ph.D. (Medical College of Virginia) Associate Professor of Immunology  
Richard Silver, Ph.D. (Georgetown) Associate Professor of Microbiology and Immunology  
Maurice Zauderer, Ph.D. (M.I.T.) Associate Professor of Oncology in Microbiology and Immunology  
Richard Barth, Ph.D. (Roswell Park) Assistant Professor of Oncology in Microbiology and Immunology  
J. Scott Butler, Ph.D. (Illinois, Urbana) Assistant Professor of Microbiology and Immunology  
Stephen Dewhurst, Ph.D. (Nebraska) Assistant Professor of Microbiology and Immunology  
Dwight J. Hardy, Ph.D. (Louisiana) Assistant Professor of Microbiology and Immunology  
M. Alanna Ruddell, Ph.D. (Case Western Reserve) Assistant Professor of Microbiology and Immunology  
Lisa A. Weymouth, Ph.D. (Pennsylvania) Assistant Professor of Microbiology and Immunology  
Mary Anne Courtney, Ph.D. (Miami) Instructor in Microbiology and Immunology and of Medicine  
Peter Z. Allen, Ph.D. (Columbia) Professor Emeritus of Microbiology and Immunology and of Dental Research
Microbiology, the study of microorganisms, encompasses bacteriology, virology, mycology, and parasitology and is inseparable from molecular biology, genetics, physiology, and immunology. Consequently, the bachelor of science degree program in microbiology integrates coursework in many disciplines in order to provide undergraduates with basic knowledge of the field. This program utilizes the resources of the Department of Microbiology and Immunology of the School of Medicine and Dentistry and the Clinical Microbiology Laboratories of Strong Memorial Hospital to provide undergraduates with a background in general and medical microbiology.

Students earning the B.S. in biological sciences: microbiology will possess a strong foundation in the basic introductory sciences (chemistry, biology, biochemistry), related areas (mathematics and physics), microbiology, and liberal arts. They will be well prepared to continue graduate education in microbiology, another biological science area, or a health care profession.

**MICROBIOLOGY CONCENTRATION**

Students should declare the concentration toward the end of their sophomore year. During the junior and senior years, advisors from the Department of Microbiology and Immunology will supervise a concentrator's progress. Microbiology is one of the B.S. tracks in the Undergraduate Program in Biology and Medicine. With satisfactory performance and completion of degree requirements, students will be recommended for the degree of B.S. in biological sciences: microbiology.

**REQUIREMENTS FOR CONCENTRATION IN MICROBIOLOGY**

During the freshman and sophomore years, students considering a concentration in microbiology are advised to complete the following courses, all of which are requirements for the microbiology B.S. track.

- **Introductory Courses**—BIO 110, 111, 121, and 150. Advanced Placement: Students with a score of 4 or 5 on the biology AP exam may elect to receive 4 hours of credit and place out of BIO 110 and BIO 111; in that case, they must take one additional elective/diversification course. For other options, students should consult with a microbiology department advisor.

  - Microbiology Courses—MBI 220, 221 lab (it is recommended that the lab be taken in the junior year).
  - Advanced Courses—Three courses from the following list: MBI 414, 421, 431, 443, 456, and 473.
  - Elective/Diversification—One course from the microbiology curriculum. It is to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and be approved by the Track Coordinator. One of these may be another laboratory course (see below).

  **NOTE:** Students who have received AP credit (and did not take BIO 110 or BIO 111) are required to take two elective/diversification courses.

- **Supplementary Laboratory Course**—One additional laboratory course is required, either a laboratory course in one of the biological sciences (this may also satisfy the elective/diversification course requirement [see above]); or IND 395 Independent Research (this will not count as an elective/diversification course).

- **Seminar Available for Qualified Students**—MBI 540 (with permission of instructor).

- **Allied Fields**
  1. A calculus sequence (MTH 141, 142 or MTH 161, 162) and a course in either differential equations (MTH 163), or statistics (STT 201 or 212), or computer science (CSC 181 or EE 171). (STT 211, CSC 108, and CSC 110 are not acceptable.)
  2. Four semesters of chemistry (two general and two organic courses) with lab.
  3. Two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab.

- **COURSES OF INSTRUCTION**

  **The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.**

**220. An Introduction to Microbiology and Immunology.** Introduces the student to important aspects of microbiology by examining selected microorganisms in some detail. Specific emphasis is given to structure, genetics, metabolic regulation, and interaction between the organism and its environment. Where appropriate, a comparative approach is stressed. Prerequisites: BIO 121, 150. (Fall)

**Microbiology Laboratory.** Exercises, demonstrations, and field trips are closely related to topics mentioned in MBI 220, which is taken concurrently. (Fall)

**395. Undergraduate Research in Microbiology.** For qualified and interested students, research experience in the laboratory of Department faculty members may be arranged. Arrangements need to be made well in advance. (Fall, Spring)

**414. Mechanisms of Microbial Pathogenesis.** An examination of the molecular mechanisms by which bacteria cause disease. The emphasis is on understanding how bacteria colonize the host, evade host immune defenses, and cause damage to the host, as well as understanding the regulation of synthesis, structure/function, and mode of action of bacterial toxins. Prerequisites: MBI 220 or permission of instructor. (Spring, every other year)

**421. Microbial Genetics.** An in-depth examination of some representative genetic systems in fungi, bacteria, and viral viruses. Prerequisite: MBI 220 or permission of instructor. (Spring, every other year)

**431. Microbial Physiology.** Focuses on relationships between microbial cell structure and cell functions, and on the physiologic processes involved in microbial adaptation. Global, cellular, and molecular aspects of microbial physiology are considered. Prerequisite: MBI 220 or permission of instructor. (Spring, every other year)

**445. Industrial Microbiology.** A consideration of both microbiological and engineering aspects of industrial fermentations, bioreactors, sterilization and disinfection, food treatment, food processing and environmental problems. The course includes lectures on genetic engineering, process energetics and economics, as well as laboratory exercises. Prerequisites: Organic chemistry, calculus, and an introductory biology course, or permission of the instructor. (Fall, every other year)

**456. General Virology.** Provides an introduction to bacterial, animal, and plant virology. Topics covered are general methodology or virus research, virus structure, biochemistry of viral replication, and general features of virus-host cell interaction. Prerequisites: BIO 121, 150, MBI 220 or permission of instructor. (Spring, every other year)

**473. Immunology.** Cellular and humoral response to antigenic substances; interaction of antibody and antigen; structure and genetics of antibody; T- and B-cell recognition and interaction, immune regulation. Prerequisites: BIO 121 and 150 and at least one 200-level course in a biological science. (Fall)
NEUROSCIENCE

COMMITTEE ON NEUROSCIENCE

James R.ison, Ph.D. (Michigan) Professor of Psychology and of Toxicology and in the Center for Visual Science
Carol Kelllogg, Ph.D. (Rochester) Professor of Psychology and Associate Professor of Pharmacology; Chair of the Committee
Peter Lenne, Ph.D. (Cambridge) Professor of Psychology and in the Center for Visual Science
Jerome Schwartzbaum, Ph.D. (Stanford) Professor of Psychology and of Toxicology

B.S. IN BIOLOGICAL SCIENCES:

The program in neuroscience is offered by the Center for Biological Sciences. The program in neuroscience, which leads to the Bachelor of Science in Neuroscience (see page 46), is designed to accommodate students with a wide variety of interests and future career plans. It is a track program in the Undergraduate Program in Biology and Medicine (see page 46).

The program in neuroscience is offered by the College of Arts and Science in cooperation with the School of Medicine and Dentistry. Faculty from the two campuses teach in the neurobiology courses and serve as advisors.

REQUIREMENTS FOR THE B.S. IN BIOLOGICAL SCIENCES:

NEUROSCIENCE

- Introductory Courses — BIO 110, 111, and either 121 or 150.

Advanced Placement: Students with a score of 8 or 15 on the biology AP exam may elect to receive 4 hours of credit and place out of BIO 110 and BIO 111; in that case, they must take one additional elective/diversification course. For other options, students should consult with a neuroscience department advisor.

- Neuroscience Courses — NSC 201, 203 lab (it is recommended that the lab be taken in the junior year), and NSC 301 or 302.

- Advanced Courses — Three courses from the following list: NSC 202, NSC/PSY 241, 243, 255, NSC 541/PSY 532.

- Elective/Diversification — Two courses from outside the neuroscience curriculum. One from course offerings in biochemistry, cell and developmental biology, molecular genetics, or microbiology, one from ecology and evolutionary biology or PSY 407 or NUR 213.

NOTE: Students who have received AP credit (and did not take BIO 110 or BIO 111) are required to take three elective/diversification courses.

- Allied Fields

1. A calculus sequence (MTH 141, 142 or MTH 151, 152) and a course in either differential equations (MTH 163), or statistics (STT 201 or 211), or computer science (CSC 181 or EE 171). (STT 211, CSC 108, and CSC 110 are not acceptable.)

2. Four semesters of chemistry (two general and two organic courses) with lab.

3. Two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab.

First Year

BIO 110

CHM 103/105

English

College Elective

Second Year

NSC 201

MTH 141/161

CHM 203

College Elective

First Year

BIO 110

CHM 103/105

English

College Elective

Third Year

BIO Elective

NSC Elective

Physics 113

Elective

Fourth Year

NSC Elective

MTH Elective

Elective

Elective

Elective

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

201. Basic Neurobiology.

An introductory course that covers diverse topics including basic neuronal and glial structure and ultrastructure, synaptic transmission, membrane structure, mechanism of excitation and conduction in neurons, and neuronal integration and regulation. Prerequisites: BIO 110 and 111. (Fall)

202. Developmental and Comparative Neurobiology.

Surveys the subtropics of neural development including morphogenesis of the nervous system, trophic influences of neurons on cells they innervate, specificity of neuronal connections, neural and glial interrelationships, and neurochemical, neuroanatomical, and behavioral aspects. Prerequisite: NSC 201. (Spring)

203. Laboratory in Neurobiology.

Introduces students to techniques used in the study of neuroscience. Procedures include gross brain dissection, histologic staining and microscopic examination of brain tissue, electrophysiologic analysis of neural tissue, neurochemical approaches to the study of the nervous system, stereotactic surgery and behavioral observation. Prerequisite: NSC 201. (Spring)

241. Neurobiology of Behavior.

Survey of integrative mechanisms of the brain and their expression in sensory, motor, motivational, and mnemonic functions. Same as PSY 241. Prerequisite: NSC 201 or permission of instructor. (Fall)


This course presents an introduction to the field of neurochemistry by surveying topics such as cerebral metabolism, neurochemical transmission, neuropharmacology, and membrane chemistry. The chemistry of the brain is analyzed in terms of its contribution to the role of the brain in the regulation of physiology and behavior. Suggested prerequisite: NSC 201. BIO 150 or IND 401 recommended. Same as PSY 243. (Fall)

255. Sensory Systems.

Large part of the brain is concerned with the analysis of information that impinges on the sense organs. This course deals with the operation of the sense organs— the principles of their operation and how their design balances many conflicting demands — and with the subsequent analysis by higher centers of the signals sent by the sense organs. Prerequisite: NSC 201 or PSY 151. Same as PSY 255. (Spring)

301, 302. Seminar in Neuroscience.

To be taken for one semester. The emphasis is on "neuroscience as a scientific career." Students read and lead discussions of issues of general professional concern, for example, peer review and the evaluation of research, the function of the federal research agencies, science education and teachings, and scientific ethics. As a group they prepare for and attend at least three colloquia in neuroscience, and prepare three brief reviews of current research problems for class presentation, discussion, and critique.

338. Psychology of Audition.

This course surveys auditory perception, including neural mechanisms, psychophysics, audiometry, and hearing impairment. Lecture format, with some outside speakers from the School of
Further information is available from Professor Carol Kellogg, Chair, Committee on Neuroscience, Room 186, Meliora Hall.

CHEMISTRY

Robert K. Boeckman, Ph.D. (Brandeis)  Professor of Chemistry
Richard F. Borch, Ph.D. (Columbia), M.D. (Minnesota)  James P. Wilmot  Distinguished Professor of Pharmacology and Professor of Chemistry
Richard S. Eisenberg, Ph.D. (Columbia)  Professor of Chemistry and Chair of the Department
James M. Farrar, Ph.D. (Chicago)  Professor of Chemistry
William D. Jones II, Ph.D. (California Institute of Technology)  Professor of Chemistry
Jack A. Kampmeier, Ph.D. (Illinois)  Professor of Chemistry
Andrew S. Kende, Ph.D. (Harvard)  Charles Frederick Houghton Professor of Chemistry
Robert W. Krelick, Ph.D. (Washington University)  Professor of Chemistry
Thomas R. Krugh, Ph.D. (Pennsylvania State)  Professor of Chemistry
George L. McLendon, Ph.D. (Texas A&M)  Tracy H. Harris Professor of Chemistry
R. Dwayne Miller, Ph.D. (Stanford)  Professor of Chemistry and of Optics
John S. Muenter, Ph.D. (Stanford)  Professor of Chemistry
Shaul Mukamel, Ph.D. (Tel Aviv)  Professor of Chemistry
Richard H. Schlessinger, Ph.D. (Ohio State)  Professor of Chemistry
Wolf-Udo Schröder, Ph.D. (Darmstadt)  Professor of Chemistry
Henry M. Sobell, M.D. (Virginia)  Professor of Biophysics and of Chemistry
Douglas H. Turner, Ph.D. (Columbia)  Professor of Chemistry
David G. Whitten, Ph.D. (Johns Hopkins)  C. E. Kenneth Mees Professor of Chemistry
Joseph P. Dinnozeno, Ph.D. (Cornell)  Associate Professor of Chemistry
Joshua L. Goodman, Ph.D. (Yale)  Associate Professor of Chemistry
Anne B. Myers, Ph.D. (California, Berkeley)  Associate Professor of Chemistry
Guillermo Bazan, Ph.D. (M.I.T.)  Assistant Professor of Chemistry
Eric T. Kooi, Ph.D. (Columbia)  Assistant Professor of Chemistry
Frank P. Buff, Ph.D. (California Institute of Technology)  Senior Faculty Associate in Chemistry

John R. Huizenga, Ph.D. (Illinois)  Tracy H. Harris Professor Emeritus of Chemistry and of Physics
William H. Saunders, Jr., Ph.D. (Northwestern)  Senior Faculty Associate in Chemistry

Approximately two postdoctoral fellows, 50 graduate teaching fellows, and several specially chosen undergraduates assist the faculty in the presentation of the teaching program. The majority of the teaching assistants are used in the lower level, high enrollment courses to help the students with questions and problem solving that arise out of the lectures and/or homework assignments.

There are two adjunct faculty members who teach selected courses.

The Department of Chemistry is committed to the search for new insights into problems in chemistry and to the presentation of our understanding of chemistry to students at all stages of the educational spectrum, from the beginner to the accomplished scholar. Thus, the Department presents programs of teaching and research for undergraduate, graduate, and postdoctoral students. The size and attitudes of our Department create a rich interplay among these programs. Our research and teaching goals are complementary. We want students to catch both our ideas and our enthusiasm. All faculty teach undergraduate students; all faculty are actively involved in chemical research. An undergraduate student gets the benefits of facilities and a community of faculty and students dedicated to the contemporary ideas and problems in chemistry; the faculty value the challenges and the stimulation of presenting their ideas to others and the collaboration with students that leads to new understanding. Students move easily through the spectrum of departmental activities. Undergraduates are an integral part of the research programs of the Department; it is common to find a laboratory with an undergraduate, a graduate student, a postdoctoral student, and a faculty member working side by side. In a similar fashion, some of the teaching programs in the Department involve faculty, postdoctoral students, graduate students, and advanced undergraduates working as a team to present ideas and techniques to beginning students.

Chemistry is a rich and fascinating subject that ranges in concern from macromolecular biopolymers to problems in subatomic structure and in time scales from eons to picoseconds. The skills of chemists range from sophisticated levels of mathematical abstraction to the elegant conception and execution

*Has applied for one or two semesters of leave in 1993-94.
involved in the synthesis of complex, naturally occurring molecules. The chemist’s view of the atomic and molecular structure of the world is one of the major intellectual forces that shape modern thought. The chemist’s skill and understanding have revolutionized many areas of modern society, such as agriculture, clothing and shelter, health care, and energy resources. The Department hopes, of course, to prepare and stimulate students to professional achievement and accomplishment in chemistry. At the same time, we recognize the fundamental nature of our discipline and its proper role as the basis and complement to study and accomplishment in a host of other areas. A very large number of our students will find their fascination and aspirations in related or interdisciplinary fields. We aim to give them the insights and the skills in chemistry that will support their work in these areas.

GENERAL COURSE INFORMATION

The first year chemistry offerings consist of CHM 103 or 105 in the fall semester and CHM 104 or 106 in the spring. These courses are intended for all students following programs requiring two or more years of chemistry, including those seeking careers in health professions. The courses in each semester follow the same basic curriculums, differing only in the depth of coverage and mathematical skills used in developing and applying concepts to specific problems. CHM 105 and 106 are thus enriched versions of CHM 103 and 104, respectively.

The basis for enrolling in CHM 103 or 105 is mainly a matter of high school background, mathematical skills, and to a lesser extent at the beginning, long-term interest. Generally, a student should have a math SAT score of 620 or higher, or have taken AP chemistry or calculus in high school, he or she should enroll in the enriched studies course. CHM 105. Performance and developing academic interest during the first semester determine which course to enter in the second semester. CHM 104 or 106. Prospective chemistry majors can take either CHM 105 or 103, and 104 and 106 during their first year of study. The program in the first year thus offers complete flexibility, and avoids the problem of having to choose a specific sequence before a student’s interests have developed adequately.

The chemistry department also offers an introductory course as part of the Freshman Ventures Program in the College of Arts and Science. This Venture course is the equivalent of the CHM 103, 104 or CHM 105, 106 sequences, and fully prepares students to continue to study chemistry in subsequent years.

During the second year, organic chemistry is offered with a lecture and a laboratory course each semester. The organic chemistry lectures are CHM 203 and 205 in the fall, and 204 and 206 in the spring. CHM 203 and 205 are both introductory organic chemistry courses with CHM 205 having greater depth of organic synthesis and reaction mechanisms. CHM 204 is intended for students planning to go no further in chemistry, while CHM 206 is designed for students planning further study in chemistry. CHM 210 should be taken with 206.

The Department offers undergraduate programs leading to both B.A. and B.S. degrees. In general, the programs differ in the choice and timing of courses in the junior and senior years; an early choice between programs is not required. Between the two programs, the students can arrange a chemistry major that covers the fundamentals as essential background for a specific career in some other area or that provides rigorous and thorough preparation for professional work in chemistry. A minor in chemistry is also available. Specific programs are described below.

B.A. PROGRAM IN CHEMISTRY

The B.A. program makes fewer specifications at the advanced level than the B.S. degree and encourages a wide range of elective courses. It is particularly suitable for students with interdisciplinary scientific interests in the health professions, biology, physics, geological sciences, engineering, or education. B.A. students may elect advanced courses in chemistry, including independent research, and can, thereby, create a curriculum best suited to their individual interests.

REQUIREMENTS FOR THE B.A. IN CHEMISTRY

- CHM 103/105 and 104/106
- CHM 203/205, 204/206, 207/209
- Two of the following: CHM 211, 251, 252
- Two of the following: CHM 210, 231, 232, 234
- MTH 161 and 162.
- MTH 163 or a course in computer science or statistics.
- PHY 113-114. Students wishing a more rigorous background in physics are advised to take PHY 121-123 or 121, 142 instead of 113-114.
- 8 additional credits of 200-level or higher chemistry courses or other science courses approved by the Undergraduate Advising Committee. No more than 4 credits may be from laboratory courses, and no credits can be from independent research. Examples of courses that may be used are available from the Chemistry Undergraduate Advising Committee.
- Knowledge of BASIC or FORTRAN computer programming is required for junior- and senior-level courses. This requirement may be met by taking noncredit courses offered each term by the Computing Center or by independent study.
- German is recommended for the foreign language requirement, although fulfillment of the College language requirement in any language is acceptable for the B.A.
- Additional courses in physics, mathematics, and other sciences such as biology, geology, etc., may be taken as part of the concentration.

B.A. candidates considering employment in the chemical profession or graduate work in chemistry should include CHM 210, 211, 231, 232, 251, and 252 in their curriculum.

B.S. PROGRAM IN CHEMISTRY

The B.S. program is designed primarily for students who anticipate professional careers in chemistry and related science. The program provides the range of knowledge, skills, and experience required for work as a professional chemist or for entry into graduate studies in chemistry. The fundamental work is completed by the end of the third year.
leaving the senior year free for graduate-level course work, a full year of independent research with one of the Department faculty, and an advanced laboratory course (CHM 234). The B.S. program meets all of the requirements for an American Chemical Society approved degree.

**REQUIREMENTS**
- CHM 103/105 and 104/106
- CHM 203/205, 204/206, 207/209, 210
- CHM 251 and 252
- CHM 211
- CHM 231, 232, 234
- CHM 393 (senior research, 8 credits total)
- 400-level chemistry course
- MTH 163, 162, 163, plus one additional course in mathematics, computer science, or statistics
- PHY 121-123 or 121, 142, 143
- Knowledge of FORTRAN or BASIC programming language is required for junior- and senior-level courses. This requirement may be met by taking noncredit courses offered each term by the Computing Center.
- The College language requirement must be fulfilled in either German, French, or Russian, with German the recommended choice.

While the required courses leading to a B.S. in chemistry may be scheduled with some flexibility (e.g., the mathematics and physics courses), the following program is recommended:

**First Year**
- CHM 103/105
- MTH 161
- Elective
- Elective

**Second Year**
- CHM 203/205
- CHM 207/209
- MTH 163
- PHY 122
- Elective

**Third Year**
- CHM 251
- CHM 231
- CHM 231
- Elective
- Elective

**Fourth Year**
- CHM 393
- 400-level CHM
- Elective
- Elective

**REQUIREMENTS FOR A MINOR IN CHEMISTRY**
- CHM 103/105 and 104/106
- Four of the following: CHM 203/205 and either 207/209 lab, 204/206, 211, 231, 251, 252

Courses at the 400-level may be included with the permission of the instructor. Prerequisites for advanced courses, such as the mathematics and physics prerequisites for courses in physical chemistry, must be taken in addition to the six required chemistry courses.

Each minor will be assigned a faculty advisor who must approve the student's proposed program, normally at the end of the sophomore year. Particular attention should be given to the intellectual coherence of the program in terms of the student's goals. Two courses with substantial overlap of content, such as 103/105, 203/205, 251/451, etc., should not be included in a program.

**COURSES OF INSTRUCTION**
- The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

**103. Chemical Concepts, Systems, and Practices I**
- An introductory course dealing with the properties of chemical systems primarily from a macroscopic perspective. Subjects include stoichiometry and atomic basis of matter, properties of gases, liquids, and solids, chemical equilibrium, acids and bases, solubility equilibria, oxidation-reduction reactions, and chemical thermodynamics.
- Prerequisites: high school chemistry, trigonometry, and analytical geometry.
- (Fall)

**104. Chemical Concepts, Systems, and Practices II**
- Second term of introductory course with emphasis on microscopic properties of chemical systems and descriptive chemistry. Atomic structure, chemical bonding, spectroscopy, chemical kinetics, descriptive chemistry of main group and transition elements. Laboratory work includes analytical methods in chemistry.
- Prerequisite: CHM 103 or 105.
- (Spring)

- An honors level version of 104 covering the same material in greater depth and utilizing calculus where appropriate.
- Stoichiometry, and the atomic basis of matter, properties of gases, liquids, and solids, chemical equilibrium, acids and bases, solubility equilibria, oxidation-reduction reactions, and chemical thermodynamics.
- Prerequisites: high school chemistry, trigonometry, and analytical geometry. Recommended: high school AP chemistry or calculus or math SAT score of 620 or higher.
- (Fall)

**106. Chemical Concepts, Systems, and Practices IV**
- An honors level version of 104 covering the microscopic properties of chemical systems and descriptive chemistry. Atomic structure, chemical bonding, spectroscopy, chemical kinetics, descriptive chemistry of main group and transition elements. Laboratory work includes analytical methods in chemistry.
- Prerequisite: CHM 103 or 105.
- (Spring)

- An introductory course covering chemical principles from the perspective of issues in energy and environmental topics. Topics covered include stoichiometry, chemical periodicity, heat, work, and energy, chemical equilibrium; spontaneous processes; energy from chemical processes. The course includes a laboratory and prepares students for further study in chemistry or other physical sciences.
- Prerequisite: high-school chemistry, trigonometry, and analytical geometry; enrollment in Venture VIII required.
- (Fall)

- Second term of introductory course. Topics include: energy from atoms, nuclei, and chemical bonds; structure of the atmosphere; atmospheric chemistry; environmental consequences of energy production: acid rain, global warming, ozone depletion; photochemical pollution. Aqueous resources, material preparation, purification, and recycling.
- Prerequisite: CHM 107.
- (Spring)

**203. Organic Chemistry I**
- An introduction to organic chemistry that focuses on chemical bonding, structure and stereochemistry, reactions and reaction mechanisms of organic compounds.
- Prerequisites: CHM 103/105 and 104/106 or the equivalent; co-registration in CHM 207 or 209.
- (Fall)

**204. Organic Chemistry II**
- A continuation of a two-semester sequence in the study of organic chemistry. Topics covered include the reactivity of various functional groups, approaches to organic synthesis, reactivity of conjugated systems, polymers and molecules of biological significance.
- Prerequisite: CHM 203 or 205 or the equivalent; plus one semester of organic laboratory (CHM 207 or 209 or the equivalent); co-registration in CHM 208 or 210.
- (Spring)
Organic Chemistry III. An honors level version of CHM 203 that provides a more intense treatment of introductory organic chemistry. Subjects include chemical bonding, structure and stereochemistry, reactions and reaction mechanisms of organic compounds. Prerequisites: CHM 103/105 and 104/106 or the equivalent; co-registration in CHM 209 (recommended) or 207. (Fall)

Organic Chemistry III. A detailed examination of the reactivity of complex organic molecules. The course focuses on mechanistic and synthetic aspects of organic molecules and will focus also on modern aspects of spectroscopy in organic chemistry. Prerequisites: CHM 203 or 205 or the equivalent plus one semester of organic laboratory (CHM 207 or 209 or the equivalent). Co-registration in CHM 210 is strongly recommended. (Spring)

Organic Chemistry I Laboratory. Credit—1 hour. A one lab lecture/session per week course that provides an introduction to the characterization and reactivity of organic molecules. The course provides an introduction to modern laboratory techniques used in organic chemistry. Prerequisite: co-registration in CHM 203 or 205. (Fall)

Organic Chemistry II Laboratory. Credit—1 hour. A continuation of the laboratory sequence begun in CHM 207. One laboratory lecture and lab session per week. Prerequisites: CHM 207 or 209; co-registration in CHM 204 or 206. (Spring)

Organic Chemistry III Laboratory. Credit—2 hours. Modern laboratory techniques. Recommended for students planning advanced work in chemistry and related sciences. Meets for two laboratory periods and one lab lecture per week. Prerequisite: co-registration in CHM 203 or 205. (Fall)

Organic Chemistry IIIB Laboratory. Credit—2 hours. A continuation of the advanced laboratory using modern laboratory techniques begun in CHM 209. One lab lecture and two laboratory sessions per week. This laboratory is required for chemistry majors. Prerequisites: CHM 207 or 209; co-registration in CHM 204 or 206. (Spring)

Inorganic Chemistry. Synthesis, structure, and properties of inorganic compounds. (Fall)

Computers in Chemistry. An introductory course on the use of computers in the laboratory sciences, with special emphasis on data collection and reduction. Includes an introduction to BASIC and FORTRAN and to mini-computer assembly language and systems. No previous computer experience or math sophistication is required. (Fall)

Chemical Instrumentation. Credit—3 hours. This course provides an understanding of both the method and the application of modern chemical instrumentation to chemical problems and systems. The problems are deliberately chosen to cover a range of different chemical systems. One lecture, two labs per week. (Fall)

Molecular Spectroscopy. Credit—3 hours. A thorough study of the principles and practice of spectroscopic methods of modern physical chemistry. Two lectures, one lab per week. Prerequisite: CHM 231. (Spring)

Advanced Laboratory Techniques. Credit—3 hours. Advanced laboratory techniques of synthesis, characterization, and analysis applied to problems in inorganic and organic chemistry. One lecture, two labs per week. (Spring)

Physical Chemistry I. Introduction to quantum mechanics and kinetic theory of gases. Problem oriented. Prerequisites: PHY 121–123 or 113–114, MTH 163. (Fall)

Physical Chemistry II. Thermodynamics, electrochemistry, statistical mechanics, kinetics, and chemical equilibria. Prerequisites: PHY 121–123 or 113–114, MTH 163. (Spring)

Laboratory Safety. Credit—1 hour. The course is designed to teach the student and technician safe laboratory practices for the use of chemicals, radiation, biohazards, electrical hazards, fire hazards, and hazardous waste disposal. Lectures also address the current state of federal and state regulations governing the topics listed above. Course includes lectures and hands-on sessions.

Independent Study. Individual study of advanced topics arranged by students. Prerequisite: registration in or credit for CHM 211. (Fall and Spring)

Senior Thesis Research. Independent research directed by faculty member. To be arranged during semester preceding registration. Written report required. (Fall and Spring)

Biophysical Chemistry I. Introduction to the theory and application of NMR, fluorescence, and UV-visible spectroscopic techniques as used for biochemical problems. (Spring-odd years)

Biophysical Chemistry II. Explores how fundamental interactions determine the structure, dynamics, and reactivity of proteins and nucleic acids. Examples are taken from the current literature with emphasis on thermodynamic, kinetic, theoretical, and site-directed mutagenesis studies. Prerequisite: CHM 252 or its equivalent. (Spring-even years)

Advanced Inorganic Chemistry I. Bonding of inorganic complexes, mainly ligand field theory; applications of group theory; kinetics and mechanisms of inorganic reactions. (Fall)

Advanced Inorganic Chemistry II. Electronic structures of inorganic compounds, especially metal complexes; applications of group theory; spectroscopic and physical methods, including X-ray crystallography. Prerequisite: CHM 411 or 412. (Spring-even years)

Advanced Inorganic Chemistry III. Inorganic reactions and mechanisms; electron transfer chemistry; catalytic reactions; photochemistry. Prerequisite: CHM 411 or 412 with permission of the instructor. (Spring-odd years)

Introduction to Polymer Chemistry. Introduction to the chemistry of macromolecules. The course focuses on the general synthetic schemes for preparing polymers, their characterization, and general aspects of structure-property relations in polymers. Prerequisites: organic chemistry and physical chemistry or equivalent. (Fall)

Physical Chemistry and Structural Characterization of Polymers. Various aspects of the physical chemistry of macromolecules are described in the context of the direct experimental observation of these properties. Particular emphasis is given to the interpretation of characterization data from both solution and bulk measurements on polymers, as well as comparison to theoretical predictions. Prerequisite: CHM 421 or equivalent or consent of instructor. (Fall-odd years)

Synthetic Polymer Chemistry. The fundamentals of synthesizing high polymers from monomers is the major focus of this course. Advances and new concepts in polymer synthesis are covered. Industrially important polymers are considered in terms of polymer design synthesis and properties. Prerequisite: CHM 421 or equivalent or consent of instructor. (Spring-even years)

Advanced Physical Organic Chemistry I. Quantum chemistry and bonding. Woodward-Hoffman rules, spectroscopic techniques, and photophysical processes. (Fall)

Advanced Physical Organic Chemistry II. Structure and reactivity; kinetics, catalysis, medium effects, transition state theory, kinetic isotope effects, reactive intermediates, and mechanisms. (Spring)

Organic Reactions. A survey of reactions of organic substances with emphasis on those with practical synthetic utility including discussion of mechanism, scope and limitations, and stereochemical issues. (Fall)

Advanced Structure Determination. Modern methods of structure determination of complex organic molecules. Emphasis is placed on methods of spectroscopic structure determination particularly NMR and mass spectroscopy. Problem-solving protocols for structural problems encountered during organic chemical research are developed.

*Taken with consent of the instructor.
**Offered in alternate years.
Cognitive science is an interdisciplinary field combining work done in cognitive psychology, artificial intelligence and computer science, and some aspects of linguistics and philosophy. It also has strong links to education and the neurological sciences. What ties these diverse disciplines together is their common goal of achieving an understanding of how people and animals perform various cognitive activities such as thinking, learning, using language, etc., and a common perception that computational ideas of some kind can help us make progress toward this goal. Each discipline can contribute to our understanding of these activities through its own perspective and with its own research techniques and methods. By formulating a sound interdisciplinary program in which one studies the relevant aspects of all these disciplines, students will be able to acquire a broad and firm understanding of cognitive science.

Depending upon the details of their concentration, students of cognitive science are well prepared to do graduate work in many of the traditional disciplines associated with the program as well as in graduate programs in cognitive science itself. Those not wishing to go on to do graduate work will have many of the same opportunities open to them as do students who major in the traditional disciplines. The opportunities open will, of course, depend partly upon the focus of one’s program. All students in the program will benefit from the broad interdisciplinary study of cognitive science.

The faculty members interested in the Cognitive Science Program include members of the Departments of Computer Science, Foreign Languages, Literatures, and Linguistics, Psychology, Philosophy, and Physiology, the Center for the Sciences of Language, the Center for Visual Science, the Margaret Warner Graduate School of Education and Human Development, and the Center for Brain Research.

Students who wish to concentrate in cognitive science should pick up a concentration proposal form in the College Center for Academic Support, which is located in 312 Lattimore. Members of the Cognitive Science Steering Committee serve as faculty advisors for the program and are available to help students plan their concentrations.

The bachelor’s degree with honors is awarded according to three criteria: (1) successful completion of 12 credits of honors coursework (a 391 honors research course in a participating department, COG 393, Senior Project, and an advanced-level course or seminar chosen from a list of 10 offerings); (2) completion of a senior thesis; and (3) an oral defense of the thesis. Detailed information about the requirements is available in the College Center for Academic Support in 312 Lattimore.

The bachelor’s degree with distinction is awarded to students with a sufficiently high concentration grade-point average: 3.25 for distinction, 3.50 for high distinction, and 3.75 for highest distinction.

It is possible for students to earn the degree with both distinction and honors.

**Requirements for a Concentration in Cognitive Science**

For the concentration in cognitive science a minimum of 11 courses is required, including the following seven core courses and one track sequence. If a course is to count towards the cognitive science major, it must be registered with the cognitive science number.

(Students who decide to major in cognitive science after taking core courses in other departments should consult the College Center for Academic Support to make sure that the core courses are counted towards their cognitive science degree.)

**Core Courses**
- COG 101. Introduction to Cognitive Science
- COG 102/LIN 201. Introduction to Linguistics
- COG/PSY 131. Cognition (Prerequisite: PSY 101)
or

- COG/PSY 141. Biopsychology (Prerequisite: PSY 101)

or

- COG/PSY 151. Sensation and Perception (Prerequisite: PSY 101)
- COG/PHL 210. Logic
- COG/CSC 240. Introduction to Artificial Intelligence (Prerequisite: EE 171 or CSC 181)
- COG 241. LISP for Cognitive Science (Pre- or corequisite: COG 101) Must be taken concurrently with COG/CSC 240.
- COG/PHL 254. Philosophy of Psychology
- COG 271. Seminar in Cognitive Science

A track consists of a coherent group of at least four courses which focus in more depth on some particular facet of cognitive studies. Tracks may be designed individually to reflect a student's particular interests. Students are strongly encouraged to discuss the formation of their track with a member of the faculty in cognitive science. Tracks must be ultimately approved by the Cognitive Science Steering Committee.

A track may be organized as an in-depth introduction to a particular discipline (for example, a neuroscience track consisting of NSC 201, 202, 203, and 391, with chemistry and biology prerequisites) or a multidisciplinary approach to a particular topic (for example, a "vision" track consisting of PSY 131, 235, 333, and CSC 391, with math prerequisites), or a particular topic within a particular discipline (for example, an "epistemology" track within philosophy consisting of PHL 217, 243, 391, and 252).

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. Introduction to Cognitive Science. This course introduces students to the goals and methods of cognitive science. (Spring)

102. Introduction to Linguistics. Principles of structural analysis of speech phenomena. Examination of material from a wide variety of languages. (Fall and Spring)


141. Biopsychology. A survey of biological insights and implications for our understanding of human behavior. (Spring)

151. Sensation and Perception. Introduction to the fundamental facts, methods, and theories about sensing stimulation, processing information, and perceiving objects in the environment. Psychophysical and physiological aspects of vision, audition, taste, smell, and skin senses are included. (Fall)

210. Logic. Precise methods for formalizing arguments, demonstrating their validity, and proving theorems in first-order symbolic logic. (Fall)

240. Introduction to Artificial Intelligence. Survey of concepts and problems in artificial intelligence research. Information processing models. Case studies of computer programs, basic principles, applications. Introduction to the LISP programming language. (Spring)

241. LISP for Cognitive Science. A laboratory course intended to acquaint students with the elements of the programming language, LISP (used in COG 240). Students solve programming problems with the aid of the instructor. (Must be taken concurrently with COG/CSC 240.)

254. Philosophy of Psychology. A study of philosophical topics relating to psychology. What is a mind and can it be studied scientifically? Behaviorism. Justifying psychological theories. Freedom and determinism. The ethics of psychological research. (Spring)

271. Seminar in Cognitive Science. Topics include discussions of current research topics and papers from the literature. (Spring)

There are several ways for undergraduates to major in computer science. Most students will probably find one of the options under 1 will satisfy their interests in computer science. However, there are several programs addressing more specialized interests indicated in 2 through 5, and the University aims to have programs flexible enough to satisfy a broad range of interests in computer science.

1. Two degrees in computer sciences are offered through the Department of Mathematics—a B.A. in computer sciences: mathematics, and a B.S. in computer sciences: applied mathematics. Requirements for these degrees are listed on page 98.

2. The 3-2 program offered by the Department of Computer Science allows a student to earn a bachelor's degree in an undergraduate major and a master's degree in computer science in five years instead of the usual six.

3. A student may plan a specialization in computer science within the Cognitive Science Program (see page 60). This program offers a multidisciplinary approach to topics such as human knowledge, belief, reason, thinking, perception, inference, and learning. Additional information is available from the College Center for Academic Support.

4. Computer science may be used as an option in the Integrated Sciences Program (see page 92). CSC 181 or EE 171 are considered introductory courses, and all 200-level courses are considered advanced courses.

5. A student may set up an individualized major in the Interdepartmental Degree Program (see page 92). This option requires the approval of the Committee on Individualized Interdepartmental Concentrations.

In addition, computer engineering may be studied through the College of Engineering and Applied Science in the Department of Electrical Engineering or in that college's interdepartmental program (see pages 142 and 156).

The William E. Simon Graduate School of Business Administration offers an opportunity to earn the M.B.A. degree in a 3-2 program with a concentration in computers and information systems (see pages 167-168).

Advanced undergraduates have unusual opportunities to work directly with faculty members in the Department of Computer Science on academically challenging research projects, in which particular emphasis is currently placed on the areas of artificial intelli-
The program courses offered by the Department of Computer Science use Apple Macintoshes, IBM PCs, and SUN Workstations. Programming is done both in batch computers intended for students in the social sciences and business. Solution techniques using a general-purpose programming language are compared with alternative techniques using application packages, including statistical packages, database systems, and spreadsheets, as well as graphical and programmable interface user interfaces. Examples and exercises emphasize applications. No prerequisites.

171. Introduction to Computers and Programming. Algorithmic formulation of computing problems. Introduction to Pascal programming. Topics include: structured programming, introduction to data structures, data base management, and other applications. No prerequisites. Same as EE 171. (Fall and Spring)

181. Introduction to Computer Science. This course is an intensive survey of the theory and applications of the science in computer science. It is intended primarily for students with strong programming and math backgrounds who are considering a concentration in computer science. Areas studied vary with instructor. Topics may include analysis of algorithms and data structures, computability, artificial intelligence, scientific computing, compilers and programming languages, and computer design. CSC 181 differs from other introductory computing courses (e.g., EE 171) in assuming that students already know how to program in Pascal. Prerequisite: knowledge of Pascal. (Fall)

216. Mathematical Logic I. Propositional calculus, functional calculus of first and higher order, the decision problem, consistency, completeness. Same as MTH 216 and PHL 216. (Fall)

217. Uncertain Inference. The exploration of various measures of uncertainty proposed in both philosophy and computer science. Prerequisite: PHL 210 or equivalent. Same as PHL 217. (Spring)

220. Data Structures. Linked lists, trees, stacks, queues, hash-coding. Sorting, searching, construction of scanners, and symbol tables. Prerequisites: EE 171 or CSC 181 and MTH 200 or equivalent. (Spring)

233. Number Theory and Cryptology. Divisibility, primes, congruences, pseudo-primes. Classical, public-key, and knapsack ciphers. Other topics in number theory and applications to computer sciences as time permits. Same as MTH 233. (Spring)

238. Combinatorial Mathematics. Permutations and combinations; enumeration through recursions and generating functions; Polya's theory of counting; finite geometries and block designs; counting in graphs. Same as MTH 238. (Spring)

240. Introduction to Artificial Intelligence. Introduction to the concepts, problems, and techniques of artificial intelligence, including programming in an AI-language. Prerequisite: EE 171 or CSC 181. (Spring)

247. Natural Language Processing. Introduction to techniques for building computer programs that process and understand natural languages such as English. Prerequisites: CSC 240, PHL 210, LIN 201. (Spring)


252. Programming Systems. Introduction to the design and implementation of programming languages, with emphasis on imperative languages. Virtual machines and computer organization. Fundamental language concepts: names, values, types, abstraction, control flow, referencing environments. Parallel programming models: processes, synchronization, message passing. Compilation and interpretation: parsing, semantic analysis, code generation, optimization. Course projects include the implementation of a small compiler. Prerequisite: CSC 220. (Fall)

256. Computer Systems. Introduction to computer architecture and operating systems, including parallel systems. Processor and memory organization, address translation, caching. Implementation of processes, scheduling, and synchronization. Memory management. Device management and file systems. Protection and authorization. Distributed programming: fault tolerance, availability, network management. Multiprocessor architectures, cache coherence, scalability. Course projects include the implementation of a small operating system. Prerequisite: CSC 252. (Spring)

280. Introduction to Numerical Analysis. The numerical solution to mathematical problems by computer. Linear systems, approximation, integration, and differential equations. Floating point arithmetic and consequent pitfalls of computation. Prerequisites: CSC 220 and MTH 162. Same as MTH 286. (Alternate years with CSC 288.) (Spring)
285. Introduction to the Theory of Computation. Introduction to automata theory, formal languages, computability, and computational complexity. Prerequisites: CSC 220 and MTH 162. Same as MTH 288. (Alternate years with CSC 288.) (Spring)

288. Introduction to Design and Analysis of Computer Algorithms. Introduction to general data structures and programming techniques for the design of time- and space-efficient algorithms. Prerequisites: CSC 220 and MTH 162. Same as MTH 288. (Alternate years with CSC 288.) (Spring)

309. Topcs in Computer Science. Special topics for advanced undergraduates in such areas as programming languages, artificial intelligence, and the theory of computation. Prerequisite: permission of the instructor. (Fall and Spring)

391. Independent Study in Computer Science. Special work arranged individually. Consent of the Department required. (Fall and Spring)

ECONOMICS

Jeffrey Banks, Ph.D. (Cal Tech) Professor of Political Science and of Economics

Thomas Cooley, Ph.D. (Pennsylvania) Fred H. Gruen Professor of Economics in the William E. Simon Graduate School of Business Administration and Professor of Economics

Stanley Engerman, Ph.D. (Johns Hopkins) John Munk Professor of Economics and Professor of History

Robert R. France, Ph.D. (Princeton) Professor of Economics

Jeremy Greenwood, Ph.D. (Princeton) Professor of Economics

Eric A. Hanushek, Ph.D. (M.I.T.) Professor of Economics and of Political Science and Director, W. Allen Wallis Institute of Political Economy

Ronald Winthrop Jones, Ph.D. (M.I.T.) Xerox Professor of Economics

Robert G. King, Ph.D. (Brown) Professor of Economics

Walter W. Oi, Ph.D. (Chicago) Elmer B. Nulman Professor of Economics

Charles E. Phelps, Ph.D. (Chicago) Professor of Political Science and of Economics and Chair of Community and Preventive Medicine

Charles Plosser, Ph.D. (Chicago) John M. Olin Distinguished Professor of Economics and Public Policy in the William E. Simon Graduate School of Business Administration and Professor of Economics

Alan Stockman, Ph.D. (Chicago) Professor of Economics and Director of Undergraduate Studies

William Thomson, Ph.D. (Stanford) Professor of Economics and Director of Graduate Studies

Marianne Baxter, Ph.D. (Chicago) Associate Professor of Economics

Marcus Berlant, Ph.D. (California, Berkeley) Associate Professor of Economics

Mark Bils, Ph.D. (M.I.T.) Associate Professor of Economics

John Boyd, Ph.D. (Indiana) Associate Professor of Economics

Bruce Hansen, Ph.D. (Yale) Associate Professor of Economics

James A. Kahn, Ph.D. (M.I.T.) Associate Professor of Economics

Sergio Rebelo, Ph.D. (Rochester) Associate Professor of Economics

Hanan Jacoby, Ph.D. (Chicago) Assistant Professor of Economics

Siu Fai Leung, Ph.D. (Chicago) Assistant Professor of Economics

Kenneth McLaughlin, Ph.D. (Chicago) Assistant Professor of Economics

Masao Ogaki, Ph.D. (Chicago) Assistant Professor of Economics

Changyong Rhee, Ph.D. (Harvard) Assistant Professor of Economics

Rangarajan K. Sundaram, Ph.D. (Cornell) Assistant Professor of Economics

Michael Wolkoff, Ph.D. (Michigan) Senator Lecturer in Economics and in Public Policy and Deputy Chair of the Department of Economics

Lionel Wilfred McKenzie, Ph.D. (Princeton) Wilson Professor Emeritus of Economics


Teaching assistants supervise recitation and homework sections of ECO 108, 207, 208, 209, and 231. Approximately one course per semester is taught by an advanced part-time graduate instructor.

The Department of Economics offers a program of study leading to the B.A. degree and, at the graduate level, to the M.A. and Ph.D. degrees. The Department also offers minors in economic theory and in applied economics. The Department also offers undergraduates the opportunity to earn citations of achievement in six different subfields.

The undergraduate program emphasizes the understanding of modern tools of economic analysis and their application to contemporary policy issues. Those completing an appropriate program should be adequately prepared for graduate work in economics and other professional schools. A more detailed description of the program of the Department of Economics is available from the Department office.

A substantial number of economics majors will earn a Certificate in Management Studies (see page 95). In addition, some students complete their concentration requirements by the end of the junior year and apply to 3-2 programs in Public Policy Analysis (see page 124) or in the William E. Simon Graduate School of Business Administration (see page 167). If accepted, they begin graduate work in their senior year and obtain an M.S. or M.B.A. degree at the end of their fifth year.

REQUIREMENTS FOR CONCENTRATION IN ECONOMICS

- One semester of calculus (MTH 141, 150, 161, or 171). Additional calculus (through 143, 152, 162, 172, or beyond) is recommended.
One semester of probability and statistics; SIT 165 (or 201) is recommended. SIT 211, 212, or MTH 152, while accepted, is weaker preparation for ECO 231.

ECO 108 (must not be taken after any 200-level economics course; 200-level economics course can be substituted).

ECO 207, 209, and 231 (all completed by end of junior year).

Four additional economics courses (200 level or above, except 394; five if ECO 108 is not taken).

A "C" average in the above economics courses.

Two courses beyond the introductory level in an allied field, subject to approval by the faculty advisor.

Graduation with high or highest distinction requires enrollment in the Senior Seminar or an independent study course in economics resulting in a research paper as well as distinguished performance in other economics courses.

Further information about the requirements for the concentration is available from the Department office.

CITATIONS OF ACHIEVEMENT

Students who concentrate in economics can also earn citations of achievement in any one of six fields. The Department offers citations of achievement in: macroeconomics, finance, applied microeconomics, mathematical economics, managerial economics, and economic theory and applications. More information is available from the Department office.

REQUIREMENTS FOR A MINOR IN ECONOMICS

ECONOMIC THEORY

ECO 207

ECO 209

Two of the following 200-level economics courses: 208, 231, 256, 274, 282, or 288

One statistics course: SIT 165, 201, 211, or 212

APPLIED ECONOMICS

ECO 207

ECO 209

Three additional 200-level economics courses

One statistics course: SIT 165, 201, 211, or 212

SCHEDULING

ECO 108, 207, 209, and 231 are offered in fall, spring, and summer. ECO 208, 211, 216, 217, 223, 234, 236, 251, 263, 269, 270, and 389 are generally offered once or twice each year. The remaining courses are generally offered every other year.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

108. Principles of Economics. The fundamentals of microeconomic and macroeconomic theory, with applications; preparation for subsequent economics courses. (Fall and Spring)

207. Intermediate Microeconomics. The economics of consumer choice and the demand for goods; producer choice, including the supply of goods and the demand for labor and other inputs; the effects of competition and monopoly power on prices and production. (Fall and Spring)

208. Topics in Microeconomic Theory. The major topics covered include general equilibrium analysis, problems of intertemporal allocation of resources, the economics of uncertainty, and other topics as time permits. Prerequisites: calculus and ECO 207. (Fall)

209. Intermediate Macroeconomics. National income accounting concepts; their changes and fluctuations as explained by theories of income determination. Prerequisite: ECO 207. (Fall and Spring)

211. Money, Credit, and Banking. The institutions which generate the money supply. The influence of monetary and fiscal policy on economic stability and growth. Prerequisites: ECO 207 and 209. (Fall and Spring)

216. Financial Markets: Concepts and Institutions. An introductory analysis of risks and returns on specific securities and of economic and regulatory forces shaping contemporay financial markets. Prerequisite: ECO 207. (Fall and Spring)


221. Macro Models of Labor. Models of the aggregate labor market, particularly the empirical and theoretical aspects of unemployment. Policy questions related to dealing with the labor market such as unemployment compensation are also studied. Prerequisites: ECO 207 and 209.

222. Income Distribution. Examines U.S. income distribution and modern economic and statistical theories which attempt to explain it. Areas covered include education, poverty, economic mobility, and discrimination. Prerequisites: ECO 207 and 231. (Spring)

223. Economics of the Labor Market. Economics is used to understand: the determination of wages, employment, workweeks; the acquisition of skills; unions, discrimination, and unemployment. Prerequisite: ECO 207. (Fall)

224. Economics of Sports and Entertainment. The markets for professional and amateur sports and entertainment are analyzed. Impacts of market organization and public policy on attendance, salaries, and profits are examined. (Spring)

226. Economic Development of the North Atlantic. This course is concerned with the economic development of Europe from the Middle Ages to date. Primary attention is given to Western Europe, but the impact of economic changes elsewhere is also discussed. (Spring)

American Economic Growth. American economic history from the colonial period to the 1980s including discussions of growth in the colonial economy, slavery in the American south, the rise of "big business," causes of the depression in the 1930s, and the economic conditions of the period after World War II.

227. Economics of Afro-American Slavery. The profitability and economic viability of the slave system and the effect of slavery on distribution of income as well as on the level and rate of growth of Southern per capita income are examined.

228. Monetary Theory. Factors governing the demand and supply of money, the relationships between money and levels of prices, employment and interest rates. Prerequisite: ECO 209.

231. Econometrics. Regression analysis applied to time series and cross-section data, simultaneous equations, analysis of variance. Prerequisite: SIT 165, 201, 211, or 212. (Fall and Spring)

234. Regulation of Economic Activity. Analysis of the impact of government regulation in transportation, safety, and health on economic welfare and efficiency. Same as PPA 434. Prerequisite: ECO 207.

236. Economics of Health. Analysis of factors that affect supply and demand in the market for medical care: risk, insurance, externalities, ethics, regulation. Same as PPA 436. Prerequisite: ECO 207. (Spring)

237. Economics of Education. Costs and returns to investment in education; public policy decisions about education; educational finance. Same as PPA 447. Prerequisite: ECO 207. (Spring)

238. Economics of Energy. Deals with theories of exhaustible resources, regulatory policy, and industrial organization as related to energy markets, particularly oil and natural gas. Same as PPA 438. (Fall)

248. Risk and Insurance. Applies theories of risk and insurance to issues of public policy. Same as PPA 448. Prerequisites: ECO 207 and calculus.

251. Industrial Organization—Theory and Evidence. An examination of the market structure, conduct, and performance of contemporary American industry. Assessment of industry concentration, market control, and associated pricing and innovative behavior is emphasized. Same as PPA 451. Prerequisite: ECO 207. (Fall)
Mathematical Economics. Economic issues in consumer and producer theory treated in a formal, mathematical manner. Prerequisite: calculus and ECO 207.

Introduction to Positive Political Theory. An introduction to some recent developments in explaining and evaluating government behavior. Same as PSC 282. (Fall)

Political Economy of Property Rights. This course considers the political economy of property rights with special attention to applications to natural resources problems, organizational design, post-Communist transformations. Same as PSC 286. Prerequisite: ECO 207. (Fall)

Topics in Game Theory and Social Choice. Topics in the economics and politics of public choice. Same as PSC 288 and PSC 488.

Evolution of the World Economic Order Since the Sixteenth Century. This course deals with the economic relations between the developed and less developed parts of the world since the sixteenth century. Attention is given to the impact of slavery and the slave trade upon Africa, Europe, and the Americas, and to the role of overseas trade in European and American development and its impact on the rest of the world. Same as HIS 371/471 and AAS 371. (Spring)

The Atlantic Slave Trade and Africa, 1650–1850. The main thrust of the course shows the extent to which the Atlantic slave trade retarded the development of capitalism in Africa between 1650 and 1850, and so creating the conditions for the imposition of European colonial domination on the continent from the late nineteenth century. Same as HIS 385/AAS 375. (Fall)

Senior Seminar. Supervised research on an economic problem or policy issue, culminating in papers that serve as a basis for seminars. Taken in senior year or with permission of instructor. (Spring)

Supervised Teaching of Economics. Responsibility for one recitation section, under the instructor's supervision. Departmental approval required.

Independent Study. By arrangement with the Department to permit work beyond regular course offerings.

Internship. Not for concentration credit.

Public Policy Modeling. Considers the application of microeconomic theory and organizational analysis to public policy problems. Conceptual ideas are illustrated in a variety of diverse areas such as environmental quality, welfare reform, health insurance, and educational finance. Same as PPA 433. (Spring)

Modern Value Theory I. A rigorous treatment of microeconomics including the theory of the firm, consumer behavior, and market structure. (Fall)

Modern Value Theory II. Introduction to general equilibrium analysis, including modern treatment of existence, stability, and comparative statics properties; elements of capital theory.

Macroeconomics I. A theoretical overview of aggregate economic analysis, focusing on the neoclassical and Keynesian models. The effects of government monetary, expenditure, and tax policies on real activity and the level of prices are developed within these alternative analytical frameworks. (Fall)

Macroeconomics II. Further topics in aggregate economic analysis, including the relationship of economic growth to government debt and monetary policies; the welfare cost of inflation; money demand and supply; and monetary theories of business fluctuations.

Mathematical Statistics. Introductory treatment of the elements of probability theory (combinatorics, probability spaces, distribution functions, characteristic functions); theory of point estimation (maximum likelihood, method of moments, robust estimation, non-parametric estimation); statistical hypothesis testing (statistical decision theory, parametric inference, non-parametric inference).

Mathematical Economics I. Introduction to mathematical techniques in economics. These include basic analysis and linear algebra, difference and differential equations, and convex optimization using the Kuhn-Tucker theorem. Applications to the theory of the consumer and the firm are discussed.

Introduction to Mathematical Statistics. Credit—2 hours. Elements of probability theory and statistics as employed in the econometrics sequence ECO 484–485. (Fall)

Regression Analysis for Econometrics. Credit—2 hours. Estimation and hypothesis testing in the standard linear model. Linear restrictions; dummy variables; multicollinearity; weighted least squares; specification error. Prerequisite: ECO 483 or departmental permission. Same as APS 514. (Fall)

Elements of Econometrics. Credit—3 hours. Extensions of the general linear model to handle serial correlation, heteroskedasticity, simultaneity, maximum likelihood estimation and testing. Diagnostic checking of estimated models. Problems in the analysis of individual unit data—qualitative dependent variables and sample self-selection. Prerequisite: ECO 231. Same as APS 515. (Spring)
ENGLISH

Daniel Albright, Ph.D. (Yale) Professor of English
David Bleich, Ph.D. (New York University) Professor of English and Professor in the College of Arts and Science
Morris Eaves, Ph.D. (Tulane) Professor of English and Chair of the Department
Cyrus Hoy, Ph.D. (Virginia) John B. Trevor Professor of English
James William Johnson, Ph.D. (Vanderbilt) Professor of English
James Longenbach, Ph.D. (Princeton) Joseph H. Gilmore Professor of English
Russell A. Peck, Ph.D. (Indiana) Professor of English and John H. Deane Professor of Rhetoric and English Literature
Jarold W. Ramsey, Ph.D. (Washington) Professor of English
David Rodowick, Ph.D. (Iowa) Professor of English and of Visual and Cultural Studies
Frank Shuffler, Ph.D. (Stanford) Associate Professor of English
Thomas Gavin, M.A. (Toledo) Associate Professor of English
George Grela, Ph.D. (Kansas) Associate Professor of English
*Kenneth R. Gross, Ph.D. (Yale) Associate Professor of English
Thomas G. Hahn, Ph.D. (California, Los Angeles) Associate Professor of English
Sarah Higley, Ph.D. (California, Berkeley) Associate Professor of English
Bette London, Ph.D. (California, Berkeley) Associate Professor of English and Director of Graduate Studies
John Michael, Ph.D. (Johns Hopkins) Associate Professor of English and Director of Undergraduate Studies
Joanna Scott, M.A. (Brown) Associate Professor of English
Lisa Cartwright, Ph.D. (Yale) Assistant Professor of English and of Visual and Cultural Studies
Barbara Jordan, M.A. (Boston) Assistant Professor of English
Rosemary Kegl, Ph.D. (Cornell) Assistant Professor of English
Anita Levy, Ph.D. (California, San Diego) Assistant Professor of English
Lyne Meloccaro, Ph.D. (Rutgers) Assistant Professor of English
Joyce Middleton, Ph.D. (Maryland) Assistant Professor of English
Jan-Christopher Horak, Ph.D. (Westfälische Wilhelms-Universität) Adjunct Associate Professor of English

Deborah Grayson, M.A. (Michigan State) Instructor in English
Dr. Lipcomb, M.A. (Northern Michigan University) Instructor in English
Samuel Nelson, J.D. (Syracuse) Senior Lecturer in English and Director of Forensics
George H. Ford, Ph.D. (Yale) Joseph H. Gilmore Professor Emeritus of English
Richard Gollin, Ph.D. (Minnesota) Professor Emeritus of English and Senior Faculty Associate
McCrea Hazlett, Ph.D. (Chicago) Professor Emeritus of English
Anthony Hecht, M.A. (Columbia) John H. Deane Professor Emeritus of Rhetoric and Poetry
Howard C. Hotsford, Ph.D. (Princeton) Professor Emeritus of English
Bruce Johnson, Ph.D. (Northwestern) Professor Emeritus of English and Senior Faculty Associate
Kathrine Koller, Ph.D. (Johns Hopkins) Joseph H. Gilmore Professor Emeritus of English
Beirnard N. Schilling, Ph.D. (Yale) John B. Trevor Professor Emeritus of English and of Comparative Literature

Part-time instructors and part-time assistant lecturers are not included in the above list.

The Department of English offers work leading to a concentration for the B.A. degree and, at the graduate level, to the M.A. and Ph.D. degrees. The Department also offers undergraduate minors in writing (creative writing, journalism, or English composition) in English literature, and in theater.

The program of concentration in English is designed to give students knowledge of English and American literary works in their historical and cultural contexts, and to develop writing skills, as well as critical abilities for reading in a variety of periods, genres, and methodologies.

A student preparing to concentrate in English should get in touch with the Department's Director of Undergraduate Studies, usually early in the second semester of the sophomore year. All majors are urged to consult their advisors regularly to maintain a coherent program which benefits their particular interests.

The English Honors Program is open to English majors by invitation (usually in the first semester of the junior year), students who successfully complete the Program's three-semester course of independent, intensive study (including the writing of an Honors essay) will receive a degree with Honors in English.

**GENERAL COURSE INFORMATION**

Students wishing to take any English course numbered 200 or higher are to have satisfied the College freshman writing requirement and to have taken at least one additional course in literature. Courses numbered between 111-117 and 171-179 may be taken as electives, but do not ordinarily count toward satisfaction of either College or departmental concentration requirements.

Courses numbered 200-390 are customarily open to sophomores, juniors, seniors, and qualified freshmen; approval of the instructor may be required for enrollment in some courses.

**REQUIREMENTS FOR CONCENTRATION IN ENGLISH**

A minimum of 12 courses is required, 10 in English and two in an allied field. Seven of the 10 must be in English courses at the 200 or 300 level.

1. Concentrators must take three of the following courses, ideally by the end of the sophomore year: ENG 140, 150, 151, 155.
2. Of the seven English courses at the 200 or 300 level:
   a. One must be in American literature.
   b. Two must be in literature written before 1789 or two in later literature. Only one advanced Shakespeare course may be counted toward the pre-1789 requirement; a second may be counted as an advanced elective, however. Courses in film studies do not count as literature courses before or after 1789.*
   c. Two must be courses in major British or American literary figures—Chaucer (206), Shakespeare (209, 210), Milton (213), or others to be determined and announced annually by the Department, and listed under "ENG 335. Studies of Major Literary Figures."
   d. Two must be 300-level special studies or seminar courses (320-375, 396).
   e. At least five must be taken in residence at the University of Rochester.

3. Of the 12 courses, two must be advanced courses in an allied field; normally these will be in a single department, but two thematically related courses in different departments may be used with approval. Courses in British and American history, non-English literature, women's studies, African-American studies, linguistics, philosophy, religion, or art history are highly recommended.

Permission of the instructor is required for 113, 114, 115, 116, 117, 124, 178, 179, 360, 361, and 396.

*ENG 200, 245-248, 250, 251-253, 317, 339, 360, 361 do not qualify as courses in "literature written before or after 1789"; they all qualify as electives for the seventh course beyond the 100 level; however, Special studies and seminar courses numbered 128-139 may or may not count, depending on the content in a given seminar; questions should be directed to the Director of Undergraduate Studies.
REQUIREMENTS FOR A MINOR IN ENGLISH

The Department of English offers three minor fields of study, one in literature and two in areas tangential to literary study but separate from it. The latter two (the minor in writing with its three tracks and the minor in theater) emphasize the practical sides of the discipline and are open to English majors as well as nonmajors. (The minor in English literature is not, of course, open to English majors.) All three minors stipulate a minimum of six courses, five of which must be taken in residence. No more than two courses in one's major may be counted toward the minor. Students wishing to minor in English should contact the Director of Undergraduate Study in English.

THE MINOR IN ENGLISH LITERATURE

a. ENG 150. English Literature I.
b. ENG 151. English Literature II.

or

ENG 155. American Literature.
c. Four additional courses in British or American literature, three of which must be on the 200 or 300 level.

NOTE: Writing courses on the 100 level (i.e., 103-109, 115, 116) will not count as a "fourth additional course" toward the minor in English literature.

THE MINOR IN WRITING

Students minor ing in writing must choose one of the three tracks:

Journalism

Six courses are required:
a. ENG 113w. Reporting and Writing the News.
b. ENG 114w. Journalism Workshop.
c. At least one of the following courses:
   ENG 115. Seminar in Writing.
   ENG 116. Creative Writing.
   ENG 375. Rhetoric and Style.
d. At least two of the following courses:
   ENG 117. Editing Practicum.
   ENG 392. Research Project in Journalism.

b. At least one advanced creative writing course:
   ENG 360. Advanced Creative Writing: Poetry.
   ENG 361. Advanced Creative Writing: Fiction.
c. ENG 375. Rhetoric and Style.

or

ENG 245. Literary Criticism.
d. Additional courses, if needed, to be chosen from the Department's offerings in writing or from 200-level literature courses within the College.

English Composition

Six courses are required:
a. ENG 115. Seminar in Writing.
b. ENG 375. Rhetoric and Style.
c. At least one of the following courses:
   ENG 392. Research Project in Writing.
   ENG 394. Internship.
d. Additional courses, as needed, to be chosen from the following:
   ENG 113. Reporting and Writing the News.
   ENG 116. Creative Writing (poetry, fiction, or playwriting).

200-level literature courses within the College of Arts and Science.

THE MINOR IN THEATER

The minor in theater consists of a minimum of six courses taken from the following three categories. No more than two courses included in one's major may be counted toward the minor.
a. Production and Performance Courses.
   Credits—8 in all.
   ENG 383/385. Plays in Production. Credit—2 hours.

b. Theater Method and History Courses.
   Credits—8 in all.
   Either:
   ENG 177. Stage Craft.
   or
   ENG 178. Acting.

c. Dramatic Literature.
   Credits—8 in all.
   ENG 140, 209, 210, 340. Shakespeare.
   ENG 233. Medieval Drama.
   ENG 234. Elizabethan and Stuart Drama.
   ENG 235. Restoration and Eighteenth-Century Drama.
   ENG 236. Modern Drama.
   ENG 335. Major Author, if the author happens to be a playwright.

Other courses in dramatic literature in the Departments of English, Foreign Languages, Literature, and Linguistics, and Religion and Classics, such as CLT 241—Tragedy and the Representation of Pain; CLT 245—Dialectics and Aesthetics of Brecht; CLT 252—Theory of Modern Theater; FR 262—Twentieth-Century French Theater; SP 262—Golden Age Drama; SP 283—Twentieth-Century Spanish American Drama.

SCHEDULING

The following courses are usually offered in both fall and spring semesters:

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. English as a Second Language.
Credit—4 hours. A review of writing skills, both syntactic and rhetorical, through a controlled writing workshop. This course also focuses on vocabulary development and oral presentation skills.

102. The English Language. The study of English grammar and usage with some attention to the history and development of usage, to conventional modes of communication, and to issues in language.

103. Writing and Thinking. Introduction to effective writing, argument, and research of different kinds. Study of reading organized on thematic principles. Eight to 10 required essays, ranging in length from 300 words to 3,500 words.

104. Fictions and Realities. A writing course based on book-length and shorter fiction and nonfiction, with attention to different genres and modes of discourse in various disciplines. Emphasis on mastery of rhetorical strategies in writing (six to eight essays).

105. Ventures in Composition. The sections of this course are part of the Freshman Ventures program and are linked to courses in other fields; students enrolled in 105 must have been accepted into a Venture. Readings are selected in coordination with the other courses (six to eight essays).

106. Film Literature. Learning to describe and explain style, narrative, and ideology in an international array of films from several periods and genres.

107. The Lyric in English. Representative major poets, illustrating poetic exploration of human experience (six to eight essays).

108. Narrative Literature. Representative ways of dealing with experience in narrative forms; readings drawn primarily from works in English (six to eight essays).

109. Dramatic Literature. World drama of many periods, illustrating the representations of experience within theatrical conventions (six to eight essays).

110. Introduction to Literature. From the Renaissance to modern periods. Closed to juniors and seniors concentrating in English.

111. Specialized Types of Composition. Credit—2 hours. Specialized types of writing in the humanities, natural sciences, social sciences, or medicine.

113. Reporting and Writing the News. A laboratory course (requiring typing) on the fundamentals of gathering, assessing, and writing news. (Fall)

114. Journalism Workshop. A workshop administered by the Department of English and the Gannett Newspapers. (Spring)

115. Seminar in Writing. Students read essays from a range of contexts in the arts and sciences, and are likely to write personal essays as well as expository analyses of literature, art, film, and popular culture. Continued emphasis on mastery of voice, argument, and rhetorical strategy with attention to the political nature of language or the relation of language to ideology. Prerequisite: Primary Writing Course.

116. Creative Writing. Short story, poetry, and playwriting workshops; comparison of student work with the best achievements in imaginative writing.

117. Editing Practicum. Practicum-seminar on editing a newspaper, with special attention to the Campus Times.

123. Speech. Practice in effective small-group communication and the presentation of expository and persuasive speeches.

124. Forensics. Practice in formal address: argumentative, ceremonial, and expository presentations to large groups.

125. Debate. Critical thinking and reasoned decision making through argumentation. (Fall)

126. Advanced Debate. Debate theory and practice through varsity-level intercollegiate competition and research. (Spring)

132. Introduction to the Art of Film. The primary visual, aural, and narrative structures and conventions by which motion pictures create and comment upon significant human experience. Same as AH 112.

133. Introduction to Film History: Silent Cinema. An introduction to silent film, necessary for an understanding of cinema in general; sound film is offered second semester.

134. Introduction to Film History: Sound Cinema. An introduction to the sound film.

140. Classical and Scriptural Backgrounds of English Literature. The great tradition, from Homer, Greek drama, Plato, and Virgil to the Bible and Dante. Required of all English majors. (Fall and Spring)

142. Issues in British and American Literature. The study of a significant literary group, movement, or theme chosen by the instructor. May be repeated for credit.

144. Introduction to Shakespeare. A selection of his major plays. (Fall and Spring)

147. Early American Literature and American Studies. The colonial and early national search for and creation of the "American" as reflected in myths, politics, and literature.

150. English Literature I. An introductory study of early English literature, its forms and themes, and the development of our literary tradition. (Fall)

151. English Literature II. Major themes and central ideas in English literature of the eighteenth, nineteenth, and twentieth centuries. (Spring)

155. American Literature. Significant achievements by American writers of poetry, fiction, and other prose in the nineteenth and twentieth centuries. (Fall and Spring)

174. Issues in Technical Theater. Special topics in technical theater: Costume design and construction, technical direction, stage management, and theatrical make-up. (Fall and Spring)

175. History of the Theater. The cultural, economic, artistic, and architectural history of the theater from Greek and Roman to modern times.

176. Drama and Theater. Plays of various kinds, with scene studies and discussion of the relation of dramatic texts to suitable production.

177. Stage Craft. An introductory course to the theories, methods, and practice of set construction, power tools, rigging, stage lighting, drafting, sound, and scene painting. Lab participation in theater program productions required.

178. Acting. Training in the techniques by which individual actors set forth the characters recorded in dramatic texts. Prerequisite: ENG 176. (Fall)

179. Directing Practicum. Training in the methods by which actor and director embody the dramatic text: emphasis on studio practice. Limited to one or two students already directing a play that semester. Prerequisite: ENG 176.

190–199. Preceptorials. Freshman-level courses on special topics.

200. History of the English Language. English sounds, inflections, syntax, and vocabulary, emphasizing the structure of present-day English. Same as LIN 235.

201. Old English Literature. Literature written in England before the Norman Conquest. Latin works will be read in translation; vernacular works, in the original. (Fall)


206. Chaucer. The principal works of Chaucer, in their historical and intellectual context. Readings in Middle English.

207. Middle English Literature. Poetry, prose, and drama of the thirteenth, fourteenth, and fifteenth centuries, exclusive of Chaucer. Readings in Middle English. (Spring)

208. The English Renaissance. Sixteenth-century literature from Sir Thomas More to Spenser, with some attention to the continental background.

209. Shakespeare, 1590–1600. Study of selected plays with concentration on comedies and histories. (Fall)
210. Shakespeare, 1601–1611. Study of selected plays with concentration on tragedies and romance. (Spring)

212. English Literature of the Early Seventeenth Century. Leading poets and prose writers from Donne and Bacon to 1660. (Fall)

213. Milton. The works of Milton in their historical and intellectual context. (Spring)

214. Restoration and Eighteenth-Century Literature (1660–1780). A survey of the major works of the period. (Fall)

215. The Age of Dryden and Pope. A survey of representative works from the Restoration and early eighteenth century. (Fall and Spring)

216. The Age of Johnson (1740–1798). Literature of the second half of the eighteenth century with special attention to the writings of Samuel Johnson and his circle. (Spring)

217. Romantic Literature. Major writers, other than novelists, of the early nineteenth century, with particular emphasis on poems from Blake through Keats. (Fall)

218. Victorian Literature (1830–1900). The major intellectual, cultural, and artistic developments of the Victorian period, in prose, drama, verse, and related arts. (Spring)

219. Victorian Poetry and Poetics. A study of the major Victorian poets from Tennyson to the early Yeats, and of the critical problems they confronted. (Fall)

220. Early American Literature. From 1630 to 1830, including Puritan nonfiction and poetry; exploration narrative; and fiction, drama, and poetry of the Revolutionary and early national eras. (Fall)

221. The American Renaissance. From 1830 to 1865, including Emerson and the Transcendental movement, abolitionist writing and slave narrative, representative fiction and poetry by Poe, Whitman, Melville, Stowe, others. (Fall)

222. American Realists. From 1886 to 1912, including poetry by Dickinson and Frost; realist and naturalist fiction by Twain, Wharton, James, Dreiser; representative nonfiction and philosophy. (Spring)

223. American Moderns. From 1913 to 1941, including Eliot, Stevens, Cathe, Faulkner, Hemingway, Fitzgerald, O'Neill, W. C. Williams, and others. (Fall)

224. American Contemporaries. From 1941 to the present; the most influential poetry, drama, and fiction of postwar America. (Spring)

226. African-American Writers. Major autobiographies and novels by African-American writers such as Frederick Douglass, Richard Wright, Maya Angelou, and Toni Morrison. (Fall)

227. Native American Literature. A survey of the continuities of Native American literary art through study of both traditional narratives and songs and contemporary Indian writing. (Spring)

228. Rise of the Woman Writer. A study of the first professional women writers in England, their place in society, and their contribution to literature and literary history. Representative writers include Aphra Behn, Eliza Haywood, Anne Finch, Susannah Centlivre, and Frances Burney. (Fall)

229. Women Novelists. The female tradition in the novel, including works by such British and North American writers as Austen, the Brontës, Eliot, Wharton, Cather, Woolf, Lessing, Morrison, and Atwood. (Spring)

230. The Early British Novel. The novel from its beginnings to the early nineteenth century, emphasizing such novelists as Defoe, Fielding, Richardson, and Austen. (Spring)

231. The English Novel from Austen to Conrad. Emphasizing such novelists as Dickens, Thackeray, Eliot, and Hardy. (Spring)

232. The Twentieth-Century British Novel. The novel from 1900 to the present, emphasizing such novelists as Conrad, Joyce, Woolf, and Lawrence. (Spring)

233. Medieval Drama. English drama from its beginnings until 1580, including material from the mystery cycles, moralities, and early Tudor drama. (Fall)

234. Elizabethan and Jacobean Drama. English Renaissance drama through 1642, exclusive of Shakespeare. (Spring)

235. Restoration and Eighteenth-Century Drama. A study of English drama from 1660 to 1700, with special attention to its relationship to literary and social history. (Spring)

236. Modern Drama. Great modern dramas from Ibsen to Ionesco as reflectors of the main currents in modern thought and feeling. (Fall)

237. Modern Poetry. An introduction to representative twentieth-century poetry. (Spring)

238. Contemporary Literature. A survey of fiction, poetry, and drama from World War II to the present. (Spring)

239. Contemporary Poetry. Poetry in English from around 1945 to the present, emphasizing various types of poetry and social history. (Spring)

245. Literary Criticism. An introduction to the history, the theory, and especially the practice of criticism. (Fall)

250. The Art of Film. Same as AH 273. (Spring)

251. Popular Film Genres. An intensive study of selected types of popular films in their larger cultural context. (Fall)

252. Issues in Film. The course takes up particular concepts, ideas, ideology in film, often spanning periods, nations, and genres. (Fall and Spring)

253. Studies in a Director. A course in the works and career of an outstanding and identifiable film director: Hitchcock, Welles, Huston, Bunuel, Renoir, etc. (Fall)

254. Film History. This course may approach a national cinema, a director, a movement, or a genre with an emphasis on period or historical context. (Spring)

255. Film Criticism. An introduction to the history, the theory, and especially the practice of criticism. (Fall)

256. Studies in a National Cinema. Films from a particular (foreign) national cinema — Japanese, German, French, Italian, and others from various periods. (Spring)

257. Media Studies. This course addresses the history and theory of a range of communications media and visual technologies in science, industry, and popular culture.

300-level Special Studies and Seminars

Most of the 300-level offerings are special courses limited in enrollment. The content of these courses is not specified, because it will be determined from the interests of students and instructors and will vary from time to time. Annual schedules will describe the content of a given course in a given semester and will indicate prerequisites for admission, if any.

320. Studies in Medieval Literature.


325. Studies in American Literature.

328. Studies in the Lyric.

329. Studies in Film.


332. Studies in Fiction.


335. Studies of a Major Literary Figure.


337. Studies in Literary Criticism.


346. Problems in Literary Criticism.

350. Issues in American Criticism and Culture.

351. Issues in Literature and History.

352. Issues in Popular Culture.


370. Literature and Cultural Identity.

372. Gender, Writing, and Representation.

373. Literature and the Visual Arts.

375. Rhetoric and Style. Stylistic analysis through rhetorical models from various periods throughout literary history. (Spring)

380. Movement Credit -- 2 hours.

381. Studies in Theatrical Design. An indepth study of the theories and methods of scene design, lighting design, and costume design. Topics will vary each time the course is offered. Prerequisite: ENG 177.
Environmental Degree Programs

Two majors are offered in this field: a B.S. in environmental science and a B.A. in environmental studies. Both programs are administered by the Department of Geological Sciences.

Advising Committee for Environmental Degree Programs

Thomas T. Bannister, Ph.D. (Illinois)  
Professor of Biology and of Biophysics
John C. Friedly, Ph.D. (California, Berkeley)  
Professor of Chemical Engineering
Lawrence W. Lundgren, Jr., Ph.D. (Yale)  
Professor of Geology
John S. Muen ter, Ph.D. (Stanford)  
Professor of Chemistry
David L. Weimer, Ph.D. (California, Berkeley)  
Professor of Political Science and of Public Policy
Udo Fehn, Ph.D. (Munich)  
Associate Professor of Geology and Director of the Programs
Robert J. Poreda, Ph.D. (California, San Diego)  
Assistant Professor of Geology

Requirements for the B.S. in Environmental Science

The B.S. in environmental science provides a broad basis in the natural sciences and their applications to processes and problems in the environment. This degree is intended for students who are interested in a career in environmental research. Students going through this program will be able either to seek employment directly or to go to programs which offer advanced degrees in environmental science.

Basic courses:
BIO 110, 111
CHM 103/105/107, 104/106/108, 203/205, 207
GEO 101
MTH 161, 162 (or 141-143), 163
PHY 113/121, 114/122

Core courses:
GEO 247, 282, 319 (GEO 119 may be substituted if taken as part of Venture V)

Technical electives:
Four technical electives are required, chosen from tracks in biology/toxicology, chemistry/chemical engineering, or geology. Courses in this category are selected by the student in consultation with a faculty advisor from a list of courses appropriate for the program. The program is completed with a closure course (8 credit hours), which consists either of a senior thesis or of a combination of internship, practicum, and seminar in the environmental sciences.

Suggested Course Sequence for the B.S. in Environmental Science

First Year
MTH 161  
CHM 103/105/107  
GEO 101
Elective  
(hum. or soc. sci.)

Second Year
BIO 110  
GEO 282  
CHM 203/205 + 207
Elective  
(hum. or soc. sci.)

Third Year
PHY 122  
GEO 319  
MTH 163
Elective  
(hum. or soc. sci.)

Fourth Year
Closure Course  
Technical Elective  
Elective  
Elective

NOTE: Acceptable substitutions are PHY 113/114 for PHY 121/122, MTH 141–143 for MTH 161/162, and GEO 119 for GEO 319.

Requirements for the B.A. in Environmental Studies

The B.A. in environmental studies combines courses necessary for the basic understanding of processes in the environment with courses dealing with theories of economics and political science. This program is intended for students who are interested in the economic and political consequences of problems in the environment. Students who complete this program typically go into fields such as environmental law or public policy.

Basic courses:
BIO 110
CHM 103/105/107
GEO 101
MTH 161 (or 141, 142)

Core courses:
GEO 247, 282, 319 (GEO 119 may be substituted if taken as part of Venture V)

Elective courses:
Elective courses come from two groups: natural sciences/engineering and social sciences. A total of seven elective courses is required (three or four from either group), to be chosen by the student in consultation with a faculty advisor from a list of courses appropriate for this program. In addition, one course in statistics, mathematics, or computer science is required. The program is completed with a closure course which will be either a senior thesis, internship, or suitable seminar.
FILM STUDIES

Film studies offers an interdepartmental concentration leading to a bachelor's degree. A minor in film studies is also available.

FILM STUDIES PROGRAM FACULTY
William B. Hauser, Ph.D. (Yale)  
Professor of History
James W. Johnson, Ph.D. (Vanderbilt)  
Professor of Political Science and of Film Studies
John E. Mueller, Ph.D. (California, Los Angeles)  
Professor of Political Science and of Film Studies
David Rodowick, Ph.D. (Iowa)  
Professor of English and of Visual and Cultural Studies
John J. Waters, Ph.D. (Columbia)  
Professor of History
George Grella, Ph.D. (Kansas)  
Associate Professor of English and of Film Studies
Jan-Christopher Horak, Ph.D. (Westfaelische Wilhelms-Universitaet, Muenster)  
Adjunct Associate Professor of English and of Film Studies and Curator of Film at the International Museum of Photography at George Eastman House
Sharon Willis, Ph.D. (Cornell)  
Associate Professor of French and of Visual and Cultural Studies
Lisa Cartwright, Ph.D. (Yale)  
Assistant Professor of English and of Visual and Cultural Studies
Richard M. Gollin, Ph.D. (Minnesota)  
Professor Emeritus of English and of Film Studies and Senior Faculty Associate

REQUIREMENTS FOR FILM STUDIES

The film studies concentration offers students an opportunity to explore motion pictures as an art form and as a cultural phenomenon. It consists of specific film courses offered by participating departments, and it provides opportunity for screening and analysis of centrally important films in the history of cinema from the core collection in the Film Studies Center. The archival resources of the International Museum of Photography at George Eastman House are also available for coursework and for special research projects. Twenty or more film courses are offered annually by six departments; a list is made available each semester in time for preregistration.

The concentration in film studies consists of at least eight film courses and four related nonfilm courses. The film courses should include the following:
1. An introductory film course, taken as early as possible: AH 112/ENG 132, Introduction to the Art of Film; and
2. A course in film theory.
3. Four required kinds of film courses:
   1. a course in a foreign national cinema
   2. a course in a period or problem of film history
   3. a course studying a single genre
   4. a course in filmmaking
4. The two additional film courses may be selected according to the student’s individual interests. A list of film courses is made available each year at registration time.
5. The four related nonfilm courses should be in subjects or methodologies especially helpful to the study of motion pictures. One of the four must be concerned with the visual arts, such as painting, sculpture, or photography, and one must be concerned with narrative arts, such as the short story, novel, or drama. The remaining two can be selected from a wide range of courses offered by the College, according to the student’s individual interests, subject to advisorial approval.

Double-majoring in film studies and another field is encouraged, though not more than two courses may be proposed in common for the two majors.

Film studies concentrators may, if they wish, include in their senior year an independent reading or research course, FS 391, or an independent project that calls upon the knowledge and discrimination acquired while completing these requirements.

FS 394: Film internships at television stations and local industries, and abroad, are open to film students under the sponsorship of the Undergraduate Studies Committee of the Film Studies Program. In addition, film production coursework can be taken elsewhere for credit at the University.

Students will be admitted to the concentration on recommendation of their advisor and with Committee approval. Alternative, individualized concentrations for studying motion pictures may also be proposed.

Graduates may enter the industry at low levels, though many plan to take additional work at the graduate level before seeking employment, and most use the major as a rich and satisfying course of study in the liberal arts before proceeding on to professional schools in business, law, or other fields.

REQUIREMENTS FOR A MINOR IN FILM STUDIES

- ENG 133 or 134/(AH 111). Introduction to the History of Film
- ENG 132/(AH 112). Introduction to the Art of Film
- SA 251. Introduction to Filmmaking
- Three additional film courses, chosen in consultation with the faculty advisor

Further information is available from Professor George Grella, Director, Film Studies, Rush Rhees 427, University of Rochester, Rochester, New York 14627.

COURSES OF INSTRUCTION

For full course descriptions see the departmental course listings. Note that many film courses are cross-listed between two departments.

Art and Art History
AH 111. Introduction to the History of Film. Same as ENG 133, ENG 134
AH 112. Introduction to the Art of Film. Same as ENG 132.
FOREIGN LANGUAGES, LITERATURES, AND LINGUISTICS

Thomas G. Bever, Ph.D. (M.I.T.) Professor of Psychology and of Linguistics
Gregory N. Carlson, Ph.D. (Massachusetts) Professor of Linguistics
Charles M. Carlton, Ph.D. (Michigan) Professor of French and of Romance Linguistics
Patricia Herminghouse, Ph.D. (Washington University) Karl F. and Bertha A. Fuchs Professor of German Studies
Demetrius Moustos, Ph.D. (Chicago) Professor of Linguistics
Robert ter Horst, Ph.D. (Johns Hopkins) Professor of Spanish
Philip R. Berk, Ph.D. (Pittsburgh) Associate Professor of French Literature
Gerald A. Bond, Ph.D. (Yale) Associate Professor of French and of German Literature and Associate Chair of the Department
Rosemary Feal, Ph.D. (SUNY, Buffalo) Associate Professor of Spanish
*Kathleen Parthé, Ph.D. (Cornell) Associate Professor of Russian
David Pollock, Ph.D. (California, Berkeley) Associate Professor of Japanese and of Chinese and Chair of the Department
*Claudia Scharer, Ph.D. (Washington University) Associate Professor of Spanish
*Sharon Willis, Ph.D. (Cornell) Associate Professor of French and of Visual and Cultural Studies
Joanne Bernardi, Ph.D. (Columbia) Assistant Professor of Japanese
Thomas DiPietro, Ph.D. (Cornell) Assistant Professor of French
*Eva Geulen, Ph.D. (Johns Hopkins) Assistant Professor of German
Susan Gustafson, Ph.D. (Stanford) Assistant Professor of German
*Stephen Hutchings, Ph.D. (Durham, U.K.) Assistant Professor of Russian
Beth Jorgensen, Ph.D. (Wisconsin) Assistant Professor of Spanish
Yoshisasa Kitagawa, Ph.D. (Massachusetts) Assistant Professor of Linguistics
Itziar Laka, Ph.D. (M.I.T.) Assistant Professor of Linguistics
Peter Laszlo, Ph.D. (Ohio State) Assistant Professor of Linguistics
*Wanda Rios-Font, Ph.D. (Harvard) Assistant Professor of Spanish

*Has applied for one or two semesters of leave in 1993-94.

The Department of Foreign Languages, Literatures, and Linguistics offers programs of study in many of the major modern foreign languages and literatures as well as in linguistics leading to the B.A. degree and, on the graduate level, to the M.A. and Ph.D. degrees as well.

LANGUAGE INSTRUCTION

Language instruction is offered on all levels, from elementary to advanced, in seven modern languages: Chinese, French, German, Italian, Japanese, Russian, and Spanish. Students wishing to enter a language sequence should consult with a departmental advisor for proper placement, which will be based...
on the student's previous training as revealed by scores on standard placement tests (CEEB or tests periodically offered by the University Testing Service). Departmental advisors are available during freshman orientation and preregistration periods.

Students who have satisfied the foreign language proficiency requirement of the College of Arts and Science and wish to enter advanced language or literature courses should consult with advisors in their field of interest. Students interested in course credit for advanced placement should see the undergraduate advisor in the language.

Even for nonconcentrators, foreign language skills provide an extra edge in applying for graduate study or for employment that requires travel or work in the international community. Programs such as the Certificate in Management Studies (see page 95) in combination with a language concentration offer students wider career horizons.

ADVANCED COURSES OF STUDY

Students with advanced knowledge of a language (i.e., with five or more semesters of college study completed) can choose courses from three broad areas: literature courses permit the student to analyze critically the aesthetic, philosophical, and political complexities of a society's literary traditions. Culture courses examine nonliterary texts of all kinds, from film to fashion. Advanced language courses provide further study of language itself—its production, history, and structure.

The Department also offers two programs which cut across individual languages:

Comparative literature studies literature from perspectives which cross traditional boundaries. International by definition, comparative literature systematically and thoughtfully questions linguistic and cultural limits. It opposes ethnocentrism and interrogates gender boundaries. It examines literature in relation to its historical context and establishes a dialogue between art forms. Courses in comparative literature encourage the participation of students from all disciplines, for the field entails not only the acquisition of knowledge but also the formation of critical attitudes and interpretive skills.

Linguistics offers students an opportunity to engage in the scientific and historical study of the complexities of sound, form, and meaning which distinguish human language. Questions of how languages are learned and how they are socially differentiated touch upon the concern of philosophers and social scientists. Majors in linguistics first receive basic training in general linguistic theory. Students then broaden their competence in a specific area in consultation with the undergraduate linguistics advisor, planning a track in one of the following areas: phonology, syntax and semantics, historical, sociolinguistics, psycholinguistics, computational linguistics, and descriptive linguistics of specific languages.

SPECIAL PROGRAM IN RARELY TAUGHT LANGUAGES

Special instruction is provided in a number of foreign languages which are of increasingly greater importance, either for their inherent linguistic properties or for their geopolitical significance. Such courses are intended for students who wish to avail themselves of languages not ordinarily offered in the American university. Most instruction takes place in the language laboratory, with periodic consultation with and verification by the teacher. Aural and oral skills are emphasized. Among the languages available for study are Modern Greek, Portuguese, and Romanian (which has its own listing on page 80).

Students wishing to study one of these languages should first make their interest known to the head of the linguistics section in the Department of Foreign Languages, Literatures, and Linguistics. Final approval will be given by the chair of the Department. Students must have fulfilled the University of Rochester foreign language requirement, if applicable. Students will make arrangements with the supervisor of the Language Laboratory for participation in the program on a regular basis. Attendance is mandatory. Periodic quizzes will be given, and there will be a final examination. The final grade will be assigned on the basis of the quizzes and the final examination.

CONCENTRATION PROGRAMS

The Department offers coursework and concentrations toward the B.A. degree in French, German, Japanese, Russian, Spanish, comparative literature, and linguistics; it offers minors in comparative literature and theory, French, German, Italian, Japanese, Latin American, linguistics, Russian, and Spanish studies. The Department also offers four semesters of study in American Sign Language. (Instruction in Arabic, Classical Greek, Latin, and Hebrew is offered in the Department of Religion and Classics.)
Programs within the major languages are balanced between advanced language preparation and literary and cultural studies. In upper-level courses, the reading and most of the writing and lecturing will be in the original language. Concentrators are strongly urged to enlarge their background for literary studies by taking related courses in history, fine arts, music, philosophy, and English literature.

Linguistics majors are encouraged to develop fluency in a foreign language (including American Sign Language) or competence in mathematics or computer programming.

STUDY ABROAD OPPORTUNITIES
The Department encourages students to plan a minimum of one semester of foreign study. The University is affiliated with the Institute of European Studies, which offers programs in French (Paris, Nantes), Japan (Tokyo and Nagoya), Spain (Madrid), and Mexico City, as well as with the Council on International Education Exchange programs in Russia (St. Petersburg) and the People’s Republic of China (Beijing, Nanjing, and Fudan). Qualified students may also participate in internship programs in the German Bundestag, the French National Assembly, and the Spanish Cortes, as well as in various political, business, medical, and performance internships in Bonn, Paris, and Madrid offered in conjunction with European Programs Abroad. The Department also sponsors special intensive language programs abroad during the month of June for students of French in Brittany (in western France), for students of German in Marburg, Germany, for students of Italian in Palermo and Rome, and for students of Russian in Moscow in Russia. Students interested in studying abroad should consult with their departmental advisor and seek the assistance of the College Center for Academic Support.

Upperclass students are eligible for exchange fellowships with the University of Cologne (Germany) and the University of Haute-Bretagne (Rennes, France); the awards cover full tuition and living expenses for one academic year.

Through the bequest of Mildred R. Burton, travel fellowships and summer study grants are available in annual competitions administered by the Department. Requirements include having completed one year of foreign language study at the University.

STUDENT TEACHING
Concentrators interested in student teaching experience for the purpose of New York State certification should consult with the Graduate School of Education and Human Development as well as their advisor.

REQUIREMENTS AND RECOMMENDATIONS FOR CONCENTRATIONS

French
1. Concentrators are required to take the following courses:
   a. Four core courses: FR 200, 202, 205, and 206
   b. At least four other courses above 206. In order to achieve a balance to the student's program, at least two of the following group must be included: 208, 209, 210, 220, 230, 231, 240
   c. FR 389, the Undergraduate Seminar.

2. In addition, four allied courses are required:
   a. Two courses above the introductory level in closely related fields such as French history, art, etc.
   b. Two courses in linguistics or another literature.

3. The successful completion of the Undergraduate Seminar qualifies students for consideration of admission to the Honors Program. Arrangements for this independent study are made through the undergraduate advisor.

4. Concentrators are strongly urged to consult with the French undergraduate advisor before registering for courses.

5. Concentrators are urged to consider studying in a French-speaking country for a year, a semester, or during the summer. The University is affiliated with the Institute of European Studies at Freiburg and the European Programs Abroad internship programs in Bonn and Cologne. Work done in an approved study abroad program may be given concentration credit up to a maximum of four courses in French and two in allied fields.

6. Students intending either to teach French on the secondary level or to undertake graduate work are advised to acquire at the minimum, reading proficiency in at least one other foreign language.

Japanese
1. Concentrators are required to take the following courses (note that course numbers may change from year to year):
   b. Japanese linguistics (JPN 210)
   c. Japanese literature (JPN 240 and 250/253)

2. In addition, four upper-level courses in Japanese civilization, history, religion, art, etc. are required.

3. Concentrators are required to consult with the Japanese undergraduate advisor before registering for courses.

4. Concentrators are urged to study in Japan for a year, a semester, or a summer. The University is affiliated with the Institute of European Studies at Nanzan University in Nagoya and with Sophia University and International Christian University in Tokyo, Japan. Work done in an approved study abroad program may be given concentration credit up to a maximum of two Japanese language courses and four in allied fields.
Russian
1. Concentrators are required to take seven courses in Russian and Russian literature beyond RUS 106:
   a. Two from this group: RUS 107, 200, 201
   b. RUS 202
   c. One course from each of these groups:
      • LIT 128 (same as HIS 128), RUS 129
      • RUS 261, 269
      • RUS 263, 264, 265
   Majors are required to take the special registration sections for all 200-level literature courses.
2. A senior essay, RUS 393, will be written in close consultation with a faculty advisor in linguistics or literature.
3. In addition, four allied courses, normally above entry level, are required in fields such as Russian history, political science, linguistics, comparative literature or another national literature, including English. At least two of these allied courses must be taken in departments other than FLLL.
4. Majors are urged to consider studying in Russia for a semester or during the summer. Work done on the Council on International Education Exchange program or an approved program may be given concentration credit up to a maximum of two courses in Russian and two in allied fields.
5. Students intending to undertake graduate work in Russian are advised to acquire, at the minimum, reading proficiency in French or German.

Spanish
1. Concentrators are required to take at least eight 200-level courses in Spanish:
   a. A common core consisting of: SP 200 or 201, 202 or 204, 203
   b. At least five additional courses in either language or literature or both above the 200 level.
2. Concentrators are required to consult with the Spanish undergraduate advisor before registering for courses.
3. In addition, two courses in related fields, to be determined in consultation with the student's advisor, are required.
4. Concentrators are urged to consider studying in a Spanish-speaking country for a year, a semester, or during the summer. The University is affiliated with the Institute of European Studies at Madrid and Mexico City and the European Programs Abroad internship in the Cortes, Madrid. Work done in an approved study abroad program may be given concentration credit up to a maximum of four courses in Spanish and two in allied fields.
5. Students intending to undertake graduate work in Spanish are advised to acquire, at the minimum, reading proficiency in at least one other foreign language.

Comparative Literature and Theory
The major in comparative literature and theory provides students with work in a wide range of theories of the nature of literary texts and interdisciplinary approaches to them.
1. This major is designed for students with reading proficiency in at least one foreign language, and with interests in interdisciplinary approaches to literature and culture. There are two options: comparative studies of two foreign literatures or interdisciplinary comparative studies.
2. The following courses are required:
   a. At least five courses in one foreign literature based on texts in the original language.
   b. Four additional courses can be chosen from one of the following options:
      • courses in a second foreign literature (based on texts in the original language)
      • courses in comparative literature, literature in translation, or related fields (English, philosophy, fine arts, music, film studies) chosen in consultation with the advisor for comparative literature to complement the student's program.
3. At least two courses in literary theory or practical criticism, one of which must be CLT 389, the senior seminar.

Linguistics
1. A minimum of eight courses in linguistics is required:
   a. LIN 201
   b. Two from LIN 202, 203, 204, and 205
   c. Two from LIN 212, 213, 214, 215, 216, 217, 218, and 219
   d. Three from the remaining 200-level courses.
2. Also required are four selected courses above the introductory level in an allied field: anthropology, computer science, education, English, mathematics, philosophy, or psychology. Any foreign language course qualifies as an allied field; the study of languages is encouraged for the major.
3. The exact choice of courses within the concentration will depend on the student's main interest and will be worked out with the undergraduate advisor.

REQUIREMENTS AND RECOMMENDATIONS FOR MINORS
Minor in Comparative Literature and Theory
The minor in comparative literature and theory provides students with work in a wide range of theories of the nature of literary texts and critical approaches to them. The minor is intended to supplement the study of a national literature or of any program based in another text-based discipline (e.g., history, art, philosophy, film, psychology, anthropology).
1. CLT 210. Introduction to Critical Theory or
   CLT 220. Introduction to Cultural Studies (4 credits)

2. Three other 200- or 300-level courses in comparative literature or literary theory, to be chosen in close consultation with the undergraduate advisor in comparative literature. At least two of the courses must be in CLT. With the prior approval of the advisor for CLT, the student may choose one of the three courses from the advanced-level offerings in a national literature or from another discipline: such a course should offer direct contact with original and critical texts, and contribute materially to the student's work in the minor.
3. CLT 389. Senior Seminar. Original and independent work on a topic of interest to the student. (4 credits)

Not more than two of the six courses may be counted toward the student's major.

Minor in Linguistics
The minor in linguistics requires five courses in linguistics. The courses must include LIN 201, LIN 202 (Syntax), and LIN 203 (Phonology), plus two other linguistics courses at the 200 level.

Minors in Modern Languages
Language minors give students sufficient facility in the use of a foreign language to read sources in the major field with ease, to converse with some facility, and to have knowledge of other lands, their history, their institutions, and their artistic achievements. The minor is not thought of as giving students a total picture of a field that is too large even for an undergraduate major. Rather, it is to give students a coherent set of courses from which they can branch out into the more thorough study of their given field.

Students minorning in languages are urged to consider studying abroad for a year, a semester, or during the summer. The University is affiliated with the Institute of European Studies programs in Freiburg, Nantes, Paris, Tokyo, Nagoya, Madrid, and Mexico City as well as Council on International Education Exchange programs in St. Petersburg, Beijing, Nanjing, and Fudan. Students are also encouraged to investigate internship opportunities available through European Programs Abroad in Bonn, Paris, and Madrid. Up to three advanced courses done in an approved study abroad program may be approved for credit towards the minor.

Minor in French
The minor in French requires five courses beyond FR 105. These will normally include FR 106 (Intermediate French II), FR 200 (Advanced French), FR 202 (Introduction to French Literature), FR 205 (Contemporary France), and FR 206 (French Cultural Traditions). With permission of the undergraduate advisor, another 200-level course may be substituted for one of the above.
Minor in German
The minor in German requires five courses beyond GER 106. These normally include GER 200 (Advanced German), GER 202 (Contemporary German Issues), GER 203 (Introduction to German Literature), GER 205 (Texts and Contexts: 1740-1848), or GER 206 (Texts and Contexts: 1871-1945), plus two additional courses at the 200 level in German. With the permission of the advisor, students may substitute GER 106 (Intermediate German I) or one course from another department for another 200-level course.

Minor in Italian
The minor in Italian requires four courses beyond IT 106. These will normally include IT 202 (Introduction to Medieval and Renaissance Italian Literature and Culture) and IT 203 (Introduction to Modern and Contemporary Italian Literature and Culture) and two additional 200-level Italian courses. Study abroad may satisfy the requirements for the minor. It is highly recommended.

Minor in Japanese
The minor in Japanese requires JPN 101–102 and 103–106, plus three additional courses to be chosen in consultation with the department advisor from the following list, or from any higher-level Japanese language or culture courses.

Courses:
- JIN 210. Japanese Linguistics
- LIT 240. Masterpieces of Japanese Literature
- LIT 250. Modern Japanese Fiction
- AH 224. The Arts of Japan
- AH 227. Popular Arts of Pre-Modern Japan
- HIS 177. Traditional Japanese Culture
- HIS 276. Japan and Pearl Harbor
- HIS 277. Modern Japan
- HIS 378. Urban-Industrial Japan

Minor in Russian
The minor in Russian requires five courses beyond RUS 103. These will normally include RUS 106 (Intermediate Russian II), RUS 200 (Advanced Russian Language I), and three additional courses at the 200 level in Russian. With permission of the advisor, students may substitute one course from another department for one of the 200-level courses in Russian, provided that this course is directly concerned with Russian culture or history.

Minor in Spanish
The minor in Spanish requires five courses beyond SP 105. These will normally include SP 106 (Intermediate Spanish I), 200 or 201 (Advanced Spanish Language I and II), and three additional courses in Hispanic literature, language, or linguistics at the 200 level, taken on campus or abroad. The student's minor program should be approved by the Spanish section at its beginning stage.

Minor in Latin American Studies
The minor in Latin American studies can serve to complement the student's major field of concentration by giving him or her a broad view of Latin American cultures and their relationships to the United States and the rest of the world.

Five courses with Latin American content are required for the minor, of which three must be at the 200 level from the Department of Foreign Languages, Literatures, and Linguistics, and two from related areas such as history, political science, and anthropology. The minor must be approved by the Spanish section in its beginning stages.

Normal offerings in the Department of Foreign Languages, Literatures, and Linguistics include:
- SP 204. Introduction to Spanish American Literature
- SP 206. Spanish American Civilization
- SP 285. Contemporary Spanish American Literature
- SP 230. Latin American Women: Historical and Literary Perspectives
- SP 290. Undergraduate Seminar: Topics in Spanish American Literature
- LIT 150. Topics in Afro-Latin American Culture

In history:
- HIS 242. Economies and Societies of Latin America

In anthropology:
- ANT 201. Ancient Mesoamerica
- ANT 241. America's First Civilizations
- ANT 245. Religion in Ancient Mesoamerica

In African American studies:
- AAS 246. Liberation Theologies in Africa and the Americas

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

LITERATURE IN TRANSLATION—ITALIAN
143. China and Japan. An introduction to the cultures of the East through its fundamental texts.
240. Masterpieces of Japanese Literature. Great works of traditional literature, including The Tale of Genji, military romances, Noh drama, Haiku poetry, etc.
250. Modern Japanese Fiction. A survey of the most important modern Japanese fiction, including works by Soseki, Tanazaki, Kawabata, Mishima, Abe, Oe, Kaiko.

LITERATURE IN TRANSLATION—RUSSIAN
193. Chekhov and His Contemporaries. The climax of Russian civic, lyric, and psychological realism in the works of Chekhov, late Tolstoy, Bunin, Gorky, and others. Symbolism as a reaction to realism and as the beginning of literary modernism in Russia. Optional upper-level writing requirement.
264. Literature, Art, and Culture of the Russian Revolution. From 1905–1934 Russia went through simultaneous cultural and political revolutions which gave birth to exciting experiments in the arts as well as in the organization of society. The antecedents of the two revolutions, their brief alliance, and the demise of both in 1934. The end of the avant-garde and the rise of Socialist Realism. (Spring)

265. Twentieth-Century Russian Literature. After looking briefly at the period of high socialist realism, this course concentrates on the revival of Russian literature in the post-Stalinist period. Examines the "Thaw" in culture and politics, émigré and dissident literature, and recent Russian urban and village prose. Optional upper-level writing requirement.

LITERATURE IN TRANSLATION—SPANISH
150. Topics in Afro-Latin American Culture. This course examines the black experience in Latin America (the Caribbean, Brazil, etc.) in its varied cultural expressions such as art, literature, and film. The intent of the course is to offer a wide audience an opportunity to explore these (overlooked) topics in English.

COMPARATIVE LITERATURE
100. Introduction to Comparative Literature. Introduces freshmen and sophomores to the interdisciplinary, international, and intercultural possibilities of comparative literature. (Fall)

102. Topics in Comparative Literature. An introduction to topics of interest in the field of comparative literature. Close critical scrutiny of cultural difference as manifested in a variety of literary texts and cultural phenomena. (Spring)

103. Travel Literature. An introduction to different narratives of travel, displacement, and dwelling in modern history.

145. The Experience of Otherness. Problems of cultural diversity: the immigrant experience, the philosophy of the melting-pot, mainstream vs. periphery, cultural appropriation and expropriation, languages of the norm and of transgression. (Spring)

210. Introduction to Critical Theory. Problems of culture and meaning in the Marxist, feminist, and psychoanalytic traditions, and in structuralism and post-structuralism. (Spring)

214. Feminism and Visual Analysis. An introduction to techniques of visual analysis from a feminist perspective. Examines various visual objects in relation to feminist critiques and feminist theories of visual representation. A central theme is the relation of feminist theory to feminist art practice, and to disciplinary structures in general. (Spring)

220. Introduction to Cultural Studies. Introduces the investigation of theories of culture and questions about identity and alterity in critical discourse and explores the relationship between high culture and popular culture. (Fall)

230. Third World Women. Explores women in Third World cultures in terms of the historical roots of ideologies and traditions, the reception and interpretation of Western feminism, and women's participation in the production of culture in their respective societies.

231. Confessional Modes in Literature. Approaches the concept of genre with relation to autobiography and confessions to establish a framework for the study of identity and subjectivity. (Fall)

245. Dialectics and Aesthetics: The Dramatic Legacy of Bertolt Brecht. Attention to the construction and function of a dialectical view of literary tradition and history, using Brecht's work as an example. (Fall)

251. Literature and Psychoanalysis. Designed to acquaint students with history of psychoanalytic theory, working at the intersection of psychoanalytic, linguistic, and narratological theories of representation. (Fall)

252. Theory of Modern Theater. (Spring)

253. Language Theory and Semiotics in the Eighteenth Century. The development of language theory as it relates to the concept of Enlightenment and to the aesthetics of the time with particular attention to debates on the functional nature of language and its origin. Focuses both on the establishment of a genuine semiotic and on presentational-literary reflection of language. Same as GER 293. (Spring)

269. Tolstoy and Dostoevsky. Selected major works of Russia's two greatest novelists. Same as REL 269 and RUS 269, Optional upper-level writing requirement.

AMERICAN SIGN LANGUAGE
101. Beginning American Sign Language I. An introductory course in American Sign Language (ASL), the language developed and used by the deaf community in most areas of North America.

102. Beginning American Sign Language II. Continuation of basic study of the language and culture; an opportunity to build receptive and expressive sign vocabulary, use of the signing space; further use of non-manual components including facial expression and body postures as parts of ASL grammar.

105. Intermediate American Sign Language I. Emphasizes further development of receptive and expressive skills. Introduction to language forms used in ASL poetry and to the features of culture as they are displayed in art and the theater.

106. Intermediate American Sign Language II. Consists of intensive practice involving expressive and receptive skills in complex grammatical structures, dialogues, and storytelling. Successful completion of this course fulfills the foreign language requirement.

202. History and Culture of the American Deaf Community. Discussion of various aspects of the American deaf culture, including description of deafness, the deaf community as defined by audiological and/or cultural means, and an examination of deaf history. Prerequisite: Completion of ASL 105 or permission of instructor.

205. Art of Translation: ASL and English. Introduction to the study of meaning-based translation with emphasis on major elements of narrative, dramatic, and poetic forms. Focus is on the analysis of ASL texts and the development of written English translations. Prerequisite: Completion of ASL 105 or permission of instructor.

250. Sociolinguistics of the American Deaf Community. A discussion of language variation and conflict in the deaf community and language issues in deaf education in the United States. Topics include concepts of sociolinguistics, language attitudes, language policy and planning, and discourse analysis. Prerequisite: Completion of ASL 106 or permission of instructor.

CHINESE
101. Elementary Chinese I. Credit—6 hours. Introduction to modern spoken Mandarin. Emphasis will be on developing the students' ability to speak and comprehend the most widely used dialect of modern Chinese. (Fall)

102. Elementary Chinese II. Credit—6 hours. Continuation of CHI 101, and an introduction to elementary readings in Chinese.

105. Intermediate Chinese I. Continuing study of spoken Mandarin and vernacular written materials. Prerequisite: CHI 102 or equivalent. (Fall)

106. Intermediate Chinese II. Continuation of CHI 105.

202. Advanced Chinese I. Readings in newspapers and periodicals, with emphasis upon materials from the People's Republic of China. Prerequisite: CHI 106 or equivalent. (Fall)


FRENCH
101. Elementary French I. Fundamentals of the grammar, culture, and pronunciation of the language. Emphasis is on developing communicating skills, principally speaking but including listening, reading, and writing.

102. Elementary French II. Continues the work of the beginning course. There is an added emphasis on reading comprehension and vocabulary building.

103. French Review. Builds on basic speaking and comprehension skills learned in high-school courses or in an introductory
college course. Work centers on active use of "real life" language skills. Successful completion of this course fulfills the College of Arts and Science foreign language requirement.

104. Conversational French. Credit—2 hours. Emphasis on speaking skills with focus on current issues in French culture and society. Prerequisite: FR 102 or equivalent. May be taken concurrently with FR 105 or 106. May be taken twice for credit. (Fall and Spring)

105. Intermediate French I. Intermediate level study of French and French culture. Special emphasis on the geography of France and contemporary French culture and on development of reading, discussion, and composition skills. Prerequisite: score of 500 on national test or permission of instructor. (Fall and Spring)

106. Intermediate French II. Continuation of FR 105 with emphasis on a historical approach to French culture. Continued attention given to reading, discussion, and compositional skills.

107. French in France. An intensive, conversation-grammar review course at the intermediate level. Students meet and live with French people a month in May and June, learn about French culture and have opportunities for side trips and tours to places of historical and aesthetic importance. (Higher-level students may register for FR 207.)

NOTE: FR 200 and 202 are ordinarily prerequisites for all 200-level courses in French literature.

200. Advanced French. Intensive practice in speaking and writing the language; review of grammar on an advanced level. (Fall and Spring)

202. Introduction to Textual Analysis. Introduction to and intensive practice in the reading and interpretation of French, including materials from literature, the media, and popular culture.

204. Advanced Conversational French. Credit—2 hours. Prerequisite: FR 200 or equivalent. May be taken twice for credit.

205. Contemporary France. An introduction to the social structures, institutions, and value systems which make up contemporary French society. Analysis of their manifestations in contemporary political structures and events, philosophy, art, film, the media, etc.

206. French Cultural Traditions. An introduction to pre-twentieth-century French culture. Topics include social, political, philosophical, and artistic movements across a variety of historical periods.

207. French in France. See FR 107.

208. The Linguistic Structure of French. Analysis of the contemporary French phonological and grammatical systems; reference to dialectal variations. A significant portion of the course is devoted to practical work on phonetics. Same as LIN 263. (Fall)

209. History of the French Language. Diachronic analysis of French as one of the Romance languages: its formation, development, and present state. Examination of selected texts.

210. Medieval France. A survey of medieval literature and culture. Works to be read in modern French include La Chanson de Roland, Yvain, and La Quête du Graal.

220. The French Renaissance. Introduction to the intellectual and aesthetic currents of the Renaissance; readings in Rabelais and Montaigne. (Spring)

225. Renaissance and Baroque Poetry in France.

230. The Baroque. Major texts of the late sixteenth and early seventeenth centuries. Theater, comic novels, short fiction, and poetry are covered.

251. The Classical Tradition. Major dramatic, lyric, and moral texts of late eighteenth century: Racine, Moliere, La Fontaine, La Rochefoucauld, and La Bruyere. (Fall)

240. The Eighteenth Century. Study of major authors of the French Enlightenment, as well as their predecessors and contemporaries, including Diderot, Voltaire, Prevost, Rousseau, Diderot, Sade, and Laclos. (Spring)

250. The Nineteenth Century. Topics in nineteenth-century French culture, especially those that consider the relations among the various literary genres and between these genres and other disciplines, e.g., visual arts, philosophy, history, music. (Fall)

251. French Poetry from Baudelaire to Surrealism.


260. The Twentieth Century. Topics in twentieth-century French culture, especially those that consider the relations among the various literary genres and between these genres and other disciplines, e.g., visual arts, philosophy, history, music. (Spring)

261. The Twentieth-Century Novel.

262. Twentieth-Century French Theater. Analysis of selected theatrical works of the twentieth century. To include study of production and text and the varying relationships between the two in the context of modern society.

275. Literature and Psychoanalysis. Study of the intersection of psychoanalytic, linguistic, and narratological theories of representation. (Fall)

280. French Film: The New Wave. A study of French film from its beginnings through the New Wave.

299. Studies in Translation. Advanced work in translation into and from French. Prerequisite: FR 200 or equivalent. (Spring)

388. Critical Perspectives. Coordination of the intensive study of a major French author with the reading and evaluation of a variety of critical perspectives on his work, such as Marxist, psychoanalytic, structuralist, and poststructuralist. (Fall)

389. Senior Seminar. 391. Independent Study. Study of special linguistic or literary problems under the direction of a member of the faculty.

393. Senior Essay. A paper based on independent study; may be written by concentrators. Students should normally register for this course in the fall term of their senior year.

GERMAN

100. Intensive German. Credit—6 hours. A full first-year German course taught in one semester. Training in speaking, listening, reading, and writing in extended class hours and use of labs. (Spring)

101. Elementary German I. Introduction to the structure of modern German and its basic vocabulary. Training in speaking, comprehension, reading, and writing through classroom instruction and recitation periods. (Fall)

102. Elementary German II. Continuation of GER 101. (Spring)

103. German Review. Builds on basic speaking and comprehension skills learned in high-school courses or in an introductory college course. Work centers on active use of "real life" language skills. Successful completion of the course fulfills the College of Arts and Science foreign language requirement.

104. Conversational German. Credit—2 hours. Emphasis on speaking skills with focus on current issues in German culture and society. Prerequisite: GER 102 or equivalent. May be taken concurrently with GER 105 or 106 and may also be taken twice for credit. (Fall and Spring)

105. Intermediate German I. Focus on modern German culture and civilization. Special attention to grammatical review, vocabulary, and reading skills. Prerequisite: Score of 500 on national test or permission of instructor. (Fall)

106. Intermediate German II. Continuation of GER 105 with ongoing grammatical review and increasing attention to conversation and composition. Prepares students for international "Zertifikat: Deutsch als Fremdsprache" exam. (Spring)

107. German in Germany. Credit—4 hours (based on evaluation). An intensive program offered in Germany at all levels in Marburg, Germany, for one month in summer. Instructed by native Germans with University of Rochester faculty member in residence. Includes side trips and excursions in this historic area. Higher-level students may register for GER 207.

115. German for Reading. Credit—2 hours. An accelerated course leading to the ability to translate texts both in the sciences and the humanities. After a quick introduction to grammar, texts of increasing difficulty are read. No attempt is made to speak or to write compositions in German.
NOTE: GER 200 and 202 or their equivalents are normally prerequisite for all 200-level courses in German.

200. Advanced German. Readings on current issues. Objectives include enabling students to converse freely in German on a variety of topics and the review of grammar on an advanced level with particular attention given to writing style and idiomatic German. (Fall)

202. Contemporary German Issues. An examination of major issues in German society since 1945—the division of Germany, coming to terms with the past, the European community, controversies concerning the press, the women’s movement, peace, and foreign workers—as reflected in literary and nonliterary texts. (Spring)

203. Introduction to German Literature. Introduction to the interpretation of German literary texts with emphasis on the terms and techniques of analysis. (Fall)

205. Texts and Contexts: 1740–1848. Examination of literary and nonliterary texts as they reflect and influence the development of cultural and social thought from the beginning of the Enlightenment to the years of social revolution. (Spring)

206. Texts and Contexts: 1871–1945. Examination of literary and nonliterary texts as they reflect and influence the development of cultural and social thought from the establishment of the Wilhelminian empire to the end of the Third Reich. (Spring)

207. German in Germany. See GER 107.

210. The German Play. Close background study, interpretation, and performance of a German play, chosen from a group of readings selected according to interests, ability, and composition of the class. (Spring)

221. Readings in German Cultural History: Eighteenth Century. Credit—2 hours. The reading and interpretation of significant historical and cultural texts from the eighteenth century.

222. Readings in German Cultural History: Nineteenth Century. Credit—2 hours. The reading and interpretation of significant historical and cultural texts from the nineteenth century.

223. Readings in German Cultural History: Twentieth Century. Credit—2 hours. The reading and interpretation of significant historical and cultural texts from the twentieth century.

230. Language and Style. Free composition and translation into German of texts of varying difficulty and different stylistic peculiarities.

242. Poetry and Politics. Literary histories of poetry are constructed on the premise that poetry is individual self-expression and of no communal relevance. In Germany, however, the concept of nationhood was founded on national literature—specifically poetry. This class investigates the relationship of poetic language and the foundation of collective identities, by studying authors such as Hölderlin, Hegel, Nancy, de Man, and others.

243. Criticism and Critique: The Writings of Walter Benjamin. This course seeks to provide a basis for contemporary reception of the writings of Walter Benjamin. His oeuvre is read within a systematic framework, focusing on his notions of critique and criticism against the backdrop of his contemporary reception.

244. Art and Ideology: The Dramatic Legacy of Bertolt Brecht. Brecht’s work in its location within an earlier tradition of writers whose dramatic theory and practice likewise question and seek to change the social order as well as within the dialogue of authors contemporary with his oeuvre. Attention to the construction and function of a dialectical view of literary tradition and history.

246. Thinking the End of Art. Recent theoretical discussions centered around the notion of “postmodern” have revitalized a major theme: the end of art and philosophy. This course analyzes this topos of an end.


254. Visual Aesthetics in the Eighteenth Century. This course addresses the development of a semiotic aesthetics in the eighteenth century both within a historical framework and from the perspective of modern theoretical models.

266. Gender in German Classicism. The Essential Goethe. Focuses on Goethe’s major achievements as a poet, literary critic, natural scientist, and statesman in Weimar.

270. German Romanticism. Examines the origins, crises, and resolutions of problems in aesthetics, religions, politics, and philosophy facing authors of the Romantic period in Germany.

272. Romantic Subversions: Horror Stories, Detective Stories, and Strange Fairy Tales. This course focuses on the radical subjectivity of the Romantic Movement in Germany. As aesthetic, philosophical, and literary forms, genres, and limits disintegrate into dreams, phantasmagorias, and disoriented visions, new forms of fairy tales, detective stories, and horror stories evolve. This course follows these developments in both historic and modern forms.

275. Nineteenth-Century Literature. Readings in alternate years of major writers from the period 1820–1848 or 1848–1890, with special attention to the persistence/rejection of classical ideals, the quest for emancipatory forms of social organization, the rise of industrialism, and the emergence of a realistic aesthetic and new forms of belief.

276. Nietzsche. Following chronological lines, a systematic introduction to Nietzsche’s writings, especially regarding females and the feminine. The course does not focus on any particular aspect of Nietzsche, but attempts to cover fundamental problems of Nietzschean philosophy.

278. Aesthetics and Politics: The Frankfurt School of Criticism. An examination of critical theories of cultures as they evolved in the texts of the influential group of German thinkers called the Frankfurt School.

281. Literature of the Turn of the Century. The Weimar Republic: Literature, Art, and Politics: 1918–1933. Focuses on relations between art and politics with special attention to Berlin as a cultural and intellectual center.

283. Women, Fascism, and Representation. Representations of women’s relationships to this notorious era are riddled with contradictions. We study materials which claim to represent women’s experiences and memories of this era and its aftermath, noting the perspective from which an author constructs an account of the event, the stakes involved in truth claims of survivors, and the implications for present society of the unfinished work of memory.
284. **Culture, Change, and Politics: Literature in East Germany.** Issues such as gender politics, the construction of a national identity, the relationship of history and tradition are explored using works by Christa Wolf, Heiner Müller, Jurек Becket, Christopher Hein, and others.

285. **Reading Women Writing.** Analysis of recent theoretical and literary texts which problematize the role of gender in language and authorship. Writers considered include Ingeborg Bachmann, Gabriele Wohmann, and Christa Wolf.

286. **Kafka and Kleist.** This course focuses on the psychological, philosophical, and/or existential questions posed by the short fiction of Kafka and Kleist. We explore stylistic and thematic "similarities" and "dis-similarities" in the authors' works and the problems suggested by such philological researches.

389. **Undergraduate Seminar.** Special topics.

391. **Independent Study in German.**

393. **Senior Essay.** A paper based upon independent study; may be written by concentrators, preferably in the fall term of their senior year.

399. **Practicum in German.** Investigation of special topics in German language, literature, or linguistics.

**ITALIAN**

101. **Elementary Italian I.** An introductory study of the structure of the Italian language in its spoken and written forms. (Fall)

102. **Elementary Italian II.** A continuation of IT 1. (Spring)

104. **Conversational Italian.** Credit – 2 hours. 104G: Emphasis on grammar review. 104C: Emphasis on speaking skills. Prerequisite: IT 102 or equivalent. May be taken twice for credit.

105. **Intermediate Italian I.** Continuing study of modern Italian geared to enhance speaking, reading, and writing skills. Includes grammar review. Prerequisite: IT 102 or equivalent. (Fall)

106. **Intermediate Italian II.** Continuation of IT 105. (Spring)

202. **Introductory Italian Literature and Culture.**

203. **Introduction to Modern and Contemporary Italian Literature and Culture.**

205. **Dante's Divine Comedy.** A detailed reading of the *Divine Comedy*, examines the theological, political, and literary context it evokes. (Fall)

208. **Boccaccio's Decameron.** A thorough reading of the *Decameron*, with particular attention to the literary traditions which the text absorbs and manipulates, and to the medieval intellectual debates in which it engages.

209. **Italian Cities and Their Civilizations: History, Literature, Art, Politics, Music, Folklore.**

210. **Italian Trecento.** Readings from Dante, Boccaccio, and Petrarcha in the cultural context of thirteenth- and fourteenth-century Europe. (Fall)

212. **Italian Cinema: 1935–1964.** Italian cinema experienced a dramatic rebirth after liberation in 1945. The course looks first at aspects of the cinema under Fascism, at new realism, and then at the revived commercial industry of the 1950s and early 1960s, emphasizing the variety and vitality of Italian cinema across the years.

215. **Pirandello and the Crisis of Modernity.**

232. **Detection as Genre and Metaphor: A Historical and Theoretical Perspective on Ancient, Modern, and Post-Modern Texts.** Reflects on the literary and theoretical phenomena of detective fiction, as well as on those instances in which we witness an interplay between the two. Readings for Italian credit include Gadda, Sciascia, Calvino, and Eco.

**JAPANESE**

101. **Elementary Japanese I.** Credit – 6 hours. Introduction to colloquial Japanese, with emphasis on developing speaking and comprehension skills. The writing system is also introduced for reading simple texts. (Fall)

102. **Elementary Japanese II.** Credit – 6 hours. Continuation of JPN 101. (Spring)

105. **Intermediate Japanese I.** Credit – 6 hours. Continuing study of colloquial Japanese through conversation practice and more intensive development of reading skills. Prerequisite: JPN 102 or equivalent. (Fall)

106. **Intermediate Japanese II.** Credit – 6 hours. Continuation of JPN 105. (Spring)

202. **Advanced Japanese I.** This course aims at a rapid improvement of students' overall proficiency in the Japanese language. Listening and speaking skills are improved through assignments based upon audiorecords and videotapes, discussion, and role playing in Japanese. Prerequisite: JPN 106 or equivalent. (Fall)

203. **Advanced Japanese II.** Continuation of JPN 202. Essays on Japanese literature and history. (Spring)

210. **Japanese Linguistics.** The history and structure of the Japanese language. Same as LIN 232.

220. **Readings in Japanese Culture I.** Various aspects of contemporary Japanese culture as found in magazines, journals, television, film, etc. Prerequisite: JPN 203 or approval from instructor.

221. **Readings in Japanese Culture II.** A continuation of JPN 220.

240. **Topics in Traditional Japanese Literature.** Majors attend LIT 240 with additional work in literary Japanese: topics include Genji, Heike, Noh Drama, Kabuki, Haiku, and early modern fiction and drama.

250. **Topics in the Modern Japanese Novel.** Majors attend LIT 250 with additional work in modern fiction in Japanese. Topics include readings in the works of Soseki, Tanizaki, Kawabata, Abe, Mishima, Oe, and Kaiko.

251. **Japanese Cinema.** This course examines films by a range of Japanese directors, from the 1930s to the present, focusing particularly on Ozu, Mizoguchi, Natsume, Oshima, Imamura, Itami, and Murakami.

391. **Independent Study in Japanese Language.**

392. **Practicum in Japanese.**

**ROMANIAN**

101. **Elementary Romanian I.** Introductory explanation of the structure of modern Romanian and its basic vocabulary. Practice in hearing and speaking. Reading of texts. (Fall)

102. **Elementary Romanian II.** A continuation of ROM 101. (Spring)

105. **Intermediate Romanian I.** A continuation of Romanian in its spoken and written forms. Special attention to grammar review and systematic development of vocabulary. Reading in a variety of texts (contemporary press, literary classics). (Fall)

125. **Romanian Life, Language, and Culture.** Survey of life in contemporary Romania (art, folklore, history, politics, language, and literature). (Spring)

391. **Independent Study in Romanian.** Study of special linguistic problems under the direction of a member of the faculty.

**RUSSIAN**

101. **Elementary Russian I.** An introduction to the basic grammar of Russian, with particular emphasis on reading and speaking. (Fall)

102. **Elementary Russian II.** Completes the survey of basic grammar initiated in RUS 101. In addition, short texts are read. (Spring)

104. **Russian Conversation.** Emphasis on speaking skills. Prerequisite: RUS 106.

105. **Intermediate Russian I.** Emphasis on reading, writing, conversation, and further developing understanding of grammatical concepts introduced in first-year Russian. The building of vocabulary and comprehension skills is stressed. (Fall)

106. **Intermediate Russian II.** Continuation of RUS 105 with readings in unabridged fiction and nonfiction. Continuing grammatical review and increasing attention to conversation and composition. (Spring)

107. **Russian in Moscow.** An intensive conversation-grammar review course at the intermediate to advanced level held at Moscow State University in Russia. (Summer)

129. **Russian Culture.** A series of lectures, films, excursions, and field trips designed to acquaint students with contemporary Russian culture and political issues. Held at Moscow State University in Russia. (Summer)

201. Advanced Russian II. Continuation of RUS 200. (Fall)
202. Advanced Readings in Russian. Students read, discuss, and write about a selection of Russian texts, poetry, and prose of various periods. (Spring)
265. Chekhov and His Contemporaries. The focus is on Russian civic, lyric, and psychological realism in the works of Chekhov, late Tolstoy, Bunin, Gorky, and others. Symbolism as a reaction to realism and as the beginning of literary modernism in Russia. Optional upper-level writing requirement.
264. Literature, Art, and Culture of the Russian Revolution. From 1905–1934 Russia went through simultaneous cultural and political revolutions which gave birth to exciting experiments in the arts as well as in the organization of society. The anecdotals of the two revolutions, their brief alliance, and the demise of both in 1934. The end of the avant-garde and the rise of Socialist Realism.
263. Chekhov and His Contemporaries. Emphasis on Chekhov and his world, which led to the rise of Soviet realism. The selection includes Chekhov, Tolstoy, and Bunin, among others.
262. Golden-Age Drama. Study of Spanish drama of the Golden Age. The course includes works by Lope, Tirso, and Guzman de Alfarache, among others.
260. Introduction to Spanish-American Literature. A survey from colonial to contemporary Spanish-American literature, through representative works of poetry, prose, and theater. (Fall)
208. The Linguistic Structure of Spanish: Syntax and Semantics. A presentation of topics from Spanish grammar within a modern linguistic framework, including the verbal system, aspectual choices, modal choices, and pronominal usage. Students are encouraged to apply their linguistic knowledge to literary or discursive examples. Same as LIN 267. (Fall)
209. History of the Spanish Language. Diachronic analysis of Spanish as one of the Romance languages; its formation, development, and present state. Examination of selected texts from the earliest period to modern times.
210. Topics in Hispanic Linguistics. Undergraduate seminar. Topics vary and may include Spanish dialectology, bilingualism, and Spanish sociolinguistics and pragmatics. Same as LIN 268. (Spring)
211. Medieval Spanish Literature. Study of representative texts: Poema de mio Cid, Libro de buen amor, and others from the fifteenth century. The transmission of medieval literature; relevant linguistic and social history; relations with Latin and Arabic cultures. (Spring)
215. Topics in Afro-Hispanic Literature. This course examines the literature of Spanish America and the Caribbean that focuses on the black experience. The translated literary selections, representing all genres, are situated in their respective sociohistorical contexts, as well as analyzed with respect to the broad cultural traditions of Latin America.
230. Third World Women: Latin America. Socioeconomic changes occurring in the twentieth century reinforce the need for a historical perspective and understanding of women's roles, status, and activities (social, economic, and cultural) in Latin America. This course examines Latin American women intellectuals, activists, and feminists in the context of Third World perspectives (socialist feminism, colonial domination, revolutionary societies, etc.). (Spring)
255. Spanish Poetry to 1700. Development of the poetic styles of poetry in Spain, with special attention to the Renaissance and Baroque poets from Garcilaso to Quevedo.
257. The Picaresque Novel. Reading and discussion of works by selected authors of the picaresque genre from the sixteenth and seventeenth centuries: Lazarillo de Tormes; El Buscón by Quevedo; Guzmán de Alfarache by Mateo Aleman, and others.
258. El Quijote. Detailed reading and discussion of Don Quijote. Special attention is given to Renaissance concepts of literature.
262. Golden-Age Drama. Lope, Tirso, and Calderón as the creators of an original non-Aristotelian theater.
Linguistics

100. Language and Thought (Freshman Venture). An exploration of the interdependent relationship between language and thinking from a variety of perspectives of interest to linguists, psychologists, philosophers, computer scientists, and rhetoricians.

103. Human Languages. A nontechnical introduction to the study of human languages and culture, with examples from ASL (American Sign Language), Romance, or other world languages.

150. Introduction to Signed Languages. A descriptive study of sign languages used by deaf people around the world. This course concentrates on basic linguistic and cultural aspects, with emphasis on American Sign Language (ASL). No sign language skills required.

201. Introduction to Linguistics. Introduction to methods of studying linguistic structures and to contemporary linguistic theory. NOTE: This course is a prerequisite for all 200-level linguistics courses. It may be taken concurrently with permission of the linguistics undergraduate advisor.

202. Syntax. The study of English syntax from the viewpoint of transformational grammar. Prerequisite: LIN 201.

203. Phonology. The analysis of segmental sound structure of language employing current generative theory. Prerequisite: LIN 201.

204. Semantics. An introduction to linguistic semantics. Prerequisite: LIN 201.

205. Historical Linguistics. Examination of language change through time and space. Prerequisite: LIN 201.

206. Field Methods. The methods by which the structures of previously unstudied languages are discovered.

207. Phonetics. Introduces the principles of articulatory phonetics, with some discussion of acoustic phonetics, practice in the

RARELY TAUGHT LANGUAGES

NOTE: Work for these courses takes place in Language Laboratory with periodic verification by teacher. Aural and oral skills are emphasized. Credit by arrangement.

315. Portuguese. Contemporary Portuguese, the Romance standard of Portugal and Brazil.

320. Modern Greek. The language as spoken and written in the contemporary world.

Arts and Science

263. Representation of Woman in the Hispanic Baroque. The representation of woman in the Hispanic Baroque. Woman as created by male and female authors in Spain and Spanish America.

276. Nineteenth-Century Spanish Prose. Examines the nineteenth century as a time of confrontation and contradiction; as a bridge between tradition and modernity, reason and superstition, cultural affirmation and revolution. Explores Spanish culture from the early 1800s through the crisis of 1808 in a broader European cultural context. Readings include Moratín, Larra, Galdós, Clarín, Valera, Pardo Bazán, Marx, Datwin, Freud, and the artistic vision of Goya.

277. Twentieth-Century Spanish Theater. Explores trends in Spanish theater from the early twentieth century (Valle-Inclán, García Lorca, Benavente) through post-Civil War censorship and posibilismo (Casona, Buero, Sastre, Arrabal, Ruíbal) to the most recent innovations of the 1970s and 1980s (Ana Diosdado, Antonio Gala, Francisco Nieve, Paloma Pedrero, etc.).

278. The Generation of 1898. The "Second Golden Age of Spain" and the end of the Spanish Empire considered within the broad cultural and social panorama of end-of-the-century Europe and the confrontation between traditional national values and the promises of twentieth-century "progress." Works by Valle-Inclán, Gaminet, Baroja, Azorín, Unamuno, Machado, Ortega y Gasset, and others are studied. (Fall)

280. Modern Spanish Prose. Developments in the Spanish novel after the Civil War, from its resurgence with Cela to the "new" novel of the 1960s, 1970s, and 1980s. Emphasis on relationships between social and aesthetic considerations. Readings include works by Sender, Cela, Grosso, Matute, Fretes, Goytisolo, Martin Santos, Martín Gaite, and others.

282. Modern Spanish Poetry. A study of selected works of concern to the interdisciplinarity of poetry and prose of the avant-garde movements to the poetry of social commitment. Readings from works of Huidobro, Valdés, Neruda, Guíllén, Burgos, Paz, Mistral, Parra, and Cardenal. (Spring)

283. Twentieth-Century Spanish-American Literature. A consideration of popular genres such as the comic, the detective story, the novela, the telenovela, and the novela rosa within a broader cultural context. Examines popular interpretations and reflections of high culture and the crossover between them. Considers the subversion of popular genres, the function of satire and parody, and intertextual relations in order to discuss the uses, abuses, and mass consumption of these products.

284. Spanish-American "Modernismo." Detailed study of the poetry and prose of "modernista" writers, including Martí, Gutiérrez Nájera, Casal, Dario, Silva, Lugones, Herrera y Reissig. Special attention given to the importance of "modernismo" as a renovation of Spanish-American literary language.

285. Contemporary Spanish-American Prose. A study of selected works of contemporary prose: Borges, Cortázar, García-Márquez, Fuentes, and Donoso Ruflo, and Carpenter, with emphasis on the rise of the "new" narrative in Latin America. (Spring)

286. Spanish-American Colonial Literature. Readings of important literary and historical works from the Renaissance, Baroque, and Neo-Classical periods of Spanish America. Texts include cartas de relación, diaries, chronicles of discovery and conquest, poetry (epic, lyric), satire, drama, and novel (chivalric, pastoral, picaresque).


288. Race and Gender in Afro-Hispanic Literature. This course examines the literature of Spanish America and the Caribbean that focuses on the black experience, with an emphasis on application of theoretical issues concerning race and gender. Not open to freshmen. (Fall)

289. Topics in Spanish Literature. Undergraduate seminar. Topics vary and include Cervantes' "novelas ejemplares," the modern Spanish short story, post-Franco literature, the arts and the Spanish Civil War, and other topics that consider the relations between literature and other disciplines (the visual arts, philosophy, history, music, etc.).

290. Topics in Spanish-American Literature. Topics vary from semester to semester. Possible topics include the modern Spanish-American short story, the confessional mode in Spanish literature, surrealism and the avant-garde in art and Hispanic literature, nineteenth- and early twentieth-century novel, Mexican literature, and other areas of interdisciplinary study.

291. Popular Culture in Hispanic Society. A consideration of popular genres such as the comic, the detective story, the novela, the telenovela, and the novela rosa within a broader cultural context. Examines popular interpretations and reflections of high culture and the crossover between them. Considers the subversion of popular genres, the function of satire and parody, and intertextual relations in order to discuss the uses, abuses, and mass consumption of these products.

292. Popular Culture in Hispanic Society. A consideration of popular genres such as the comic, the detective story, the novela, the telenovela, and the novela rosa within a broader cultural context. Examines popular interpretations and reflections of high culture and the crossover between them. Considers the subversion of popular genres, the function of satire and parody, and intertextual relations in order to discuss the uses, abuses, and mass consumption of these products.

293. Senior Essay. A paper based upon independent study; may be written by consensus of students and instructor. Students should normally register for this course in the fall term of their senior year.

294. Spanish Film. Devoted to the analysis of recent Spanish cinema. Beginning with the early post-Civil War period, the focus is on film as a narrative response to Spanish social reality. Considers the translation of other media (novels, short stories, etc.) to film and the interpretation of history through the medium of cinema. Includes films by directors such as Buñuel, Patiño, Ericé, Saura, García Sánchez, Almodóvar.

295. Independent Study. A paper based upon independent study; may be written by consent of instructor. Students should normally register for this course in the fall term of their senior year.
production, recognition, and transcription of sounds in various languages of the world.

208. Language Development. A basic introduction to children's language development, including the acquisition of phonology, syntax, and semantics. The course focuses on the acquisition of a variety of spoken and signed languages to find possible universal principles of language learning. Same as PSY 274.

209. Sociolinguistics. The study of language in its social context as viewed by linguists. Major credit for only one: LIN 216 or ANT 270. (Fall)

212. Syntactic Theory I. Comparison of current generative models of syntax; emphasis on description of English. Prerequisite: LIN 202 or permission of instructor.

213. Phonological Theory I. A study of nonlinear models of phonological components. Prerequisite: LIN 203 or permission of instructor. (Spring)

214. Semantic Theory I. An introduction to formal theories of linguistics of meaning. Prerequisite: LIN 204 or permission of instructor.

215. History of the French Language. A study of the history and present state. Examination of selected texts and constituent analysis; relationship of the Romance languages; their history, and their structure. Reference to their current geopolitical significance. Prerequisite: Knowledge of basic principles of linguistics or of a Romance language. (Spring)

216. Structure of the Russian Language. The formation and linguistic evolution of Russian as a Slavic language. Same as RUS 209.

217. History of the German Language. The formation and linguistic evolution of German.

218. Computational Linguistics. Introductory survey of problems involved in constructing computer programs that "understand" natural language and the methods that have been developed to overcome these problems. Prerequisite: LIN 205. (Fall)

219. Philosophy of Language. A study of philosophical questions about language and the general nature of language. Same as PSY 234. (Fall)


221. Psycholinguistics. This course is concerned with the psychological processes involved in language use. Topics covered include comprehension, production, acquisition, and applied psycholinguistics. Same as PSY 234. (Fall)

222. Applied Linguistics. This course is devoted to practical work on phonetics. Same as FR 208. (Fall)

223. History of the Spanish Language. A study of the history and present state. Same as SP 209.

224. Syntax of Spanish: Syntax and Semantics. A presentation of topics from Spanish grammar within a modern linguistic framework, including the verbal system, aspectual choices, modal choices, and pronominal usage. Students are encouraged to apply their linguistics knowledge to literary or discursive examples. Same as SPN 208. (Fall)

225. Structure of Spanish: Phonetics and Phonology. An analysis of the linguistic characteristics of the Spanish sound system, including dialectal variations and problems of second-language acquisition of Spanish by English speakers. Highly recommended for prospective teachers of Spanish. Same as SPN 207. (Fall)

226. Structure of ASL. An overview of the phonology, morphology, and syntax of American Sign Language, with emphasis on comparisons between signed and spoken languages.


228. Structure of Russian. Synchronic analysis of Russian phonology and morphology, with particular emphasis on the verb system and word-formation. Prerequisites: RUS 106 or the equivalent, or permission of the instructor. Same as RUS 256/LIN 465. (Spring)

229. Structure of German. The history and structure of the German language.


231. History of the French Language. Diachronic analysis of French as one of the Romance languages; its formation, development, and present state. Examination of selected texts. Same as FR 209.

232. History of the Spanish Language. Diachronic analysis of Spanish as one of the Romance languages; its formation, development, and present state. Examination of selected texts from the earliest period to modern times. Same as SP 209.

233. Romance Languages. Introduction to the Romance languages, major and minor, their history, and their structure. Reference to their current geopolitical significance. Prerequisite: Knowledge of basic principles of linguistics or of a Romance language. (Spring)

234. History of the English Language. English sounds, infections, syntax, and vocabulary, emphasizing the structure of present-day English. Same as ENG 200. (Fall)

235. History of the Russian Language. The formation and linguistic evolution of Russian as a Slavic language. Same as RUS 209.

236. History of the German Language. The formation and linguistic evolution of German.

237. Structure of French. Analysis of the contemporary French phonological and grammatical systems; reference to dialectal variations. A significant portion of the course is devoted to practical work on phonetics. Same as FR 208. (Fall)

238. Structure of Spanish: Syntax and Semantics. A presentation of topics from Spanish grammar within a modern linguistic framework, including the verbal system, aspectual choices, modal choices, and pronominal usage. Students are encouraged to apply their linguistics knowledge to literary or discursive examples. Same as SPN 208. (Fall)

239. Structure of Japanese: Phonetics and Phonology. An analysis of the linguistic characteristics of the Japanese sound system, including dialectal variations and problems of second-language acquisition of Japanese by English speakers. Highly recommended for prospective teachers of Japanese. Same as SPN 207. (Fall)

240. Structure of ASL. An overview of the phonology, morphology, and syntax of American Sign Language, with emphasis on comparisons between signed and spoken languages.


242. Structure of Russian. Synchronic analysis of Russian phonology and morphology, with particular emphasis on the verb system and word-formation. Prerequisites: RUS 106 or the equivalent, or permission of the instructor. Same as RUS 256/LIN 465. (Spring)

243. Structure of German. The history and structure of the German language.

244. Structure of Japanese. The history and structure of the Japanese language.

245. The Structure of Modern English. Systematic study of modern English through linguistic description and analysis. Same as ENG 248.

246. Structure of Russian. Synchronic analysis of Russian phonology and morphology, with particular emphasis on the verb system and word-formation. Prerequisites: RUS 106 or the equivalent, or permission of the instructor. Same as RUS 256/LIN 465. (Spring)

247. Structure of German. The history and structure of the German language.


249. Applied Linguistics/Second-Language Acquisition. Principles of major linguistic approaches to language—descriptive, contrastive, generative, etc.—as applied to the teaching and the acquisition of foreign languages. (Spring)

589. Senior Seminar. (2 credits)

391. Independent Study in Linguistics.

The Department offers a Freshman Ventures Program (Resources and the Environment) illustrating the importance of both natural and social-science perspectives in addressing environmental issues.

These programs are made possible by formal and informal linkages with other departments and programs, especially the Department of Biology, the Department of Mechanical Engineering, and the Committee on Individualized Interdepartmental Concentrations.

The Department considers field experience to be a valuable part of geological training and incorporates field trips into the regular schedule of many of the undergraduate courses. Students take excursions within New York and adjoining states.

The Undergraduate Student Geological Organization (USGO) is active in providing special field trips, speakers from other universities and colleges, and social events throughout the academic year. Undergraduates are also involved with departmental research projects working with faculty in a variety of fields, including geophysics, geochemistry, paleontology, petrology, structural geology, stratigraphy, and environmental geology.

Graduate work and careers in most fields demand a broad general background in the basic sciences and mathematics, and students are strongly advised to take courses beyond the minimum requirements in these subjects. All students are encouraged to gain a proficiency in reading scientific material written in any of a number of foreign languages.

**MINIMUM REQUIREMENTS FOR THE B.A. PROGRAM**

- GEO 101 and seven courses beyond 101 selected from departmental offerings: GEO 201, 221, 224, 227, 235, 283 normally included. GEO 119 or 120 acceptable if taken in the freshman year.
- Four courses in related sciences, one of which must be in mathematics.

**MINIMUM REQUIREMENTS FOR THE B.S. PROGRAM**

- GEO 101, 201, 221, 224, 227, 235, 283, and three other geology courses.
- Field course: this requirement may be satisfied by participation in a 6-8 credit summer field course in geology or, under special circumstances, by other types of supervised field experience.
- MTH 161 through 164 or an equivalent series.
- Two semesters of chemistry.
- Three semesters of physics (121, 122, and 123).
- One semester of statistics; STT 212 is recommended.

In addition to the above courses, students are encouraged to take a 400-level course or do a thesis in the senior year.

(Students should start taking related science courses as freshmen.)

Listed below is a sample arrangement of courses. Considerable variations from this sample are possible to accommodate special needs.

### B.S. PROGRAM IN GEOLOGICAL SCIENCES

#### First Year

| MTH 161 | MTH 162 |
| CHM 103 | CHM 104 |
| GEO 101 | GEO 201 |
| English Elective (hum. or soc. sci.) |

#### Second Year

| MTH 163 | MTH 164 |
| PHY 121 | PHY 122, 123 |
| GEO 221 | GEO 224 |
| Elective (hum. or soc. sci.) | Elective (hum. or soc. sci.) |

#### Third Year

| PHY 123 |
| GEO 227 |
| GEO 283 |
| STT 212 |
| Elective (hum. or soc. sci.) | Elective |

#### Fourth Year

| GEO Elective |
| GEO Elective |
| Elective | Elective |
| Elective | Elective |

### B.S. IN GEOMECANICS

This program is intended for students interested in the areas of natural science in which geology and biology overlap. Such areas include marine science (oceanography, marine biology, and marine geology), limnology, paleontology, evolutionary studies, and environmental studies.

#### Requirements

- GEO 101, 201, and 221.
- At least three additional geology courses at the 200-level or higher. GEO 224, 235, and 283 are strongly recommended.
- BIO 110, 111, 121, and 205.
- At least one course in whole-organism biology, such as BIO 125, 130, 131, or GEO 207.
- At least one course in environmental biology or geology, such as BIO 248 or 263.
- CHM 103 (or 105) and 104 (or 106).
- CHM 203 and 204, or two additional courses in geology and/or biology. (Note: students intending to do graduate work in biology should seriously consider taking the four-semester chemistry sequence. Other students are strongly recommended to take an environmentally related geology course such as GEO 248 or GEO 230.)
- MTH 141, 142, and 143 (or 161, 162 for those who qualify).
- PHY 113, 114 (or 121, 122).
- STT 212 (a computer course may be substituted).
- Field course. This requirement may be satisfied by participation in a 6-8 credit summer field course in geology or biology or, under special circumstances, by other types of supervised field experience.

In addition to the above courses, students are encouraged to take a 400-level course or do a thesis in the senior year.

### B.S. IN BIOLOGY-GEOLGY

A four-year program in geomechanics is offered jointly with the Department of Mechanical Engineering for students interested in the application of the field of mechanics to problems associated with the atmosphere, rivers, lakes and oceans, and the solid earth. Students following this program should be well equipped for graduate work in a variety of fields, including geophysics, hydromechanics, structural geology and rock mechanics, engineering geology, limnology, and coastal and marine geology. (See also a description of the
program in the section on Interdisciplinary Programs, College of Engineering and Applied Science.)

Requirements
For preparation in mathematics, the program requires MTH 161, 162 (or 141-143), 163, and 164. The required physics courses are PHY 121, 122, 123; the required chemistry course is CHM 103 (or CHM 105). In geology, GEO 101, 201, 224, and 283 are required and, in mechanical engineering, the requirements are ME 120, 123, 225, 226, and either 241 or 242.

In addition to the above courses, there are four technical electives, which may be any of the GEO or ME courses at the 200 level or higher, and one technical elective from any discipline, as agreed upon with the faculty advisor. The program includes three free electives to allow a strong minor in an area of particular interest to the student, or to broaden the scope of the curriculum.

ENVIRONMENTAL DEGREES
Two degrees are offered in the environmental field, a B.S. in environmental science and a B.A. in environmental studies. Both of these programs are administered by the Department of Geological Sciences. See the section on Environmental Degree Programs for a full description of these concentrations.

REQUIREMENTS FOR
A MINOR IN GEOLOGICAL SCIENCES
Six courses are required:
- GEO 101. Introduction to Physical Geology
- GEO 201. Evolution of the Earth
- GEO 221. Principles of Paleoecology
- GEO 283. Structural Geology
- GEO 284. Environmental Decisions
- GEO 285. Structural Geology

The environmental geology minor is intended especially for natural-science and social-science concentrators who are planning on further study or employment in environmental fields.

REQUIREMENTS FOR
A MINOR IN MARINE GEOLOGY
AND ECOLOGY
Five courses are required:
- GEO 101. Introduction to Physical Geology
- GEO 201. Evolution of the Earth
- GEO 221. Principles of Invertebrate Paleontology
- GEO 283. Structural Geology
- GEO 285. Structural Geology

This minor provides students with the opportunity to take courses and do independent research at an active marine sciences laboratory. Two required marine geology courses are to be taken at an accredited marine geology laboratory approved by the Department.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. Introduction to Physical Geology. Composition and formation of rocks and minerals in the context of planetary evolution. Surficial and internal processes of Earth and terrestrial planets. Three lectures and one lab per week.

119. Evolution of the Earth. Dynamic history of the earth, its age and evolution, and the origin and evolution of life as revealed by the geologic and fossil record. Prerequisite: GEO 101. (Spring)

201. Physical Sedimentology. Study of mineral and geological aspects, classification and anatomy, and skeletalized groups with a geologic record. (Spring)

212. Oceanography. A comprehensive survey of the chemistry, physics, biology, and geology of ocean basins and sea water. Topics include: origin of ocean basins and sea water, climate control, coastline modification, and biological productivity. (Spring)

220. Energy and Mineral Resources. A study of the principles of paleontology and a review of the invertebrate organisms of the past. Field trips. Prerequisite: GEO 201. (Fall)

222. Advanced Paleontology. An introduction to the applications and theoretical aspects of paleontology. Topics include biostatigraphy, paleobiogeography, macroevolution, and evolutionary history of the biosphere. Daily reading assignments; seminars several days of semester. (Spring)

224. Introductory Mineralogy. Introduction to crystallography, structure, crystal chemistry, classification and origin of important rock-forming minerals. Prerequisite: GEO 101 or permission of instructor. Two lectures and one laboratory. (Spring)

227. Optical Mineralogy. Principles of optical crystallography and their application in the identification of rock-forming minerals, mostly the silicates, with the polarizing microscope. Prerequisite: GEO 224 or permission of instructor. Two lectures and one lab. (Fall)

230. Introduction to Hydrogeology. Qualitative and quantitative analyses of the dynamic interaction between water and geologic media; formation of water, atmospheric processes, and the hydrologic cycle; theory and geologic controls on groundwater flow, natural groundwater geochemistry and environmental contamination. (Spring)

253. Physical Sedimentology. The basic principles of physical and chemical sedimentology are studied and applied to modern marine and nonmarine environments. The results are utilized to interpret the stratigraphic record. Prerequisite: GEO 201. (Spring)

241. Petrology. Distribution, description, classification, and origin of igneous and metamorphic rocks in the light of theoretical-experimental multicomponent phase equilibria studies; use of trace elements and isotopes as tracers in rock genesis; hand specimen and microscopic examinations of the major rock types. Prerequisite: GEO 224. Two lectures and one lab per week. (Spring)
247. **Environmental Geochemistry.** A course in the chemical and physical processes which shape our environment. These include groundwater flow, contaminant migration, ocean-atmosphere interactions, and chemistry of lakes, streams, and the oceans. **Prerequisites:** GEO 101, CHM 103, MTH 141.

248. **Introduction to Geochemistry.** Origins of the earth, atmosphere, and oceans, thermodynamics, phase equilibria, element distributions, isotope geochemistry (both radioactive and stable), weathering, aqueous solutions, diagenesis, and major geochemical cycles. **Prerequisites:** GEO 101, CHM 103, 104, MTH 143 (or consent of instructor). (Fall)

251/252. **Geological Field Trip.** Consists of five-day geological field trips held after examination period at the end of spring semester. Preceded by introductory lectures. Pass-fail grading is based on participation and evaluation of field notebook.

277. **Paleoecology.** Environmental reconstruction based on evidence from fossils and their relations with the enclosing sediment. Emphasis on the paleoecological applications of faunal distributions, adaptive morphology, taphonomy, and biogenic sedimentary structures. Field trips. **Prerequisites:** GEO 201 and 221. (Spring)

281. **Introduction to Geophysics.** Composition of the earth, radioactivity and age of the earth, gravity field and rotation, earthquakes and propagation of seismic waves, magnetic field, paleomagnetism, heat generation and heat flow, plate tectonics, and convection in the earth. **Prerequisites:** MTH 143, PHY 114, or equivalent. (Fall)

282. **Environmental Geophysics.** Physical processes at the surface of the Earth. Sources of energy: Solar energy, radioactive heat generation, heat conduction and convection. Dynamics of the crust: Earthquakes and propagation of seismic waves, plate tectonics. Movement of fluids in the oceans, rivers, and crust; physics of atmospheric motions. Influence of human activities on physical processes at surface of the Earth. **Prerequisites:** GEO 101; MTH 141. (Fall)

283. **Structural Geology.** Geometric analysis of deformed rock. Mechanical properties of rock. Theories of rock deformation. **Prerequisites:** GEO 101, 201, 224. (Fall)

285. **Structure and Tectonics of Mountain Belts.** Structural style and tectonic history of mountain belts, with special reference to Appalachians, Cordilleras, and Alps. Orogeny and its relationship to plate tectonics. **Prerequisite:** GEO 283 or equivalent. (Spring)

319W. **Geology and Environmental Policy.** The use of various types of geologic prediction in dealing with geological hazards and environmental modification. For students in both the natural and social sciences. A CAS writing course. (Fall)

340. **Environmental Decisions.** Lecture and seminar analyzing decisions about some major classes of environmental changes as seen from the viewpoint of scientists and risk analysts. For seniors and graduate students; permission of the instructor is required. A CAS writing course. (Spring)

350. **Environmental Geology in the Field and Laboratory.** Emphasizes commonly employed methods of obtaining critical geochemical and hydrogeologic data for environmental studies. Field trips involve visits to drilling sites, geotechnical and analytical labs, and an experimental field station where tests on monitoring wells can be performed. (Fall)

351. **Laboratory in Environmental Sciences.** Instruction in laboratory techniques used in the analysis of natural waters, applied to the study of local environmental problems; includes instruction in atomic absorption spectrophotometry, ion and gas chromatography as well as standard "wet" chemical techniques. **Prerequisites:** GEO 230, 247, MTH 161, CHM 103, 104. (Spring)

390. **Supervised College Teaching.** (Fall and Spring)

391. **Independent Study in Geology.** (Fall and Spring)

392. **Special Topics Seminar.** (Fall and Spring)

393. **Senior Thesis.** An individual research course for seniors who have completed the basic program of undergraduate courses required for a major. (Fall and Spring)

394. **Internship in Geology.** Experience in an applied setting supervised on site. Approved and overseen by a University instructor. **Prerequisites:** GEO 101, 201, and BIO 122. (Fall and Spring)

### HEALTH AND SOCIETY

This is an interdepartmental concentration program leading to a bachelor's degree. The concentration program is administered by the College Center for Academic Support (which is located in 312 Lattimore Hall) and is supervised by the Health and Society Committee.

**COMMITTEE ON HEALTH AND SOCIETY**

Theodore M. Brown, Ph.D. (Princeton)  
Professor of History and of Community and Preventive Medicine

Dean Harper, Ph.D. (Columbia)  
Professor of Sociology and of Psychiatry

Bruce Jacobs, Ph.D. (Harvard)  
Professor of Political Science and Director of the Public Policy Analysis Program

Charles E. Phelps, Ph.D. (Chicago)  
Professor of Political Science and of Economics; Chair of the Department of Community and Preventive Medicine, Chair of the Committee

Walter Hinchman Sangree, Ph.D.  
Chicago)  Professor of Anthropology

Tyll van Geel, Ed.D. (Harvard), J.D.  
(Albion)  Professor of Education and of Political Science

Edward Wierenga, Ph.D. (Massachusetts)  
Associate Professor of Religion

Health and society is an interdisciplinary area of study drawing upon a wide range of fields and intended for students considering careers in health care administration, health policy and planning, or the social services. Health and society concentrators planning careers in medicine should consult with a health professions advisor about premedical requirements.

The bachelor's degree with honors is awarded according to three criteria: (1) 'B +' or better performance in the following honors courses taken for the Health and Society concentration: the methods course, its affiliated core course, and CAS 301, Senior Seminar in Health and Society, in which the thesis will be written; (2) completion of a senior thesis; and, (3) an oral defense of the thesis. Detailed information about the requirements is available in the College Center for Academic Support in 312 Lattimore Hall.

The bachelor's degree with distinction is awarded to students with a sufficiently high concentration grade-point average: 3.25 for distinction, 3.50 for high distinction, and 3.75 for highest distinction.
It is possible for students to earn the degree with both distinction and honors.

**REQUIREMENTS FOR CONCENTRATION IN HEALTH AND SOCIETY**

A total of 12 courses, distributed as follows:

**Preconcentration Requirements**

(two courses)

- CAS 116. Introduction to Community Medicine (Must be taken by the end of the junior year. Offered in alternate years only.)
- STT 211. Applied Statistics for the Social Sciences

**A Methods Perspective**

(one course from the following list)

- ECO 207. Intermediate Microeconomics
- ED 421. Legal Research and Reasoning for Educators
- PHL 103. Contemporary Moral Problems
- PHL 252. Philosophy of Science
- PSC 201. Political Inquiry
- PSY 219. Research Methods in Psychology
- SOC 211. Design of Social Research

A student's program must include at least one other course in the same discipline as the methods perspective. This course must be from the core or electives list.

**Health and Society Core Courses**

(four from the following list)

- ANT 216. Medical Anthropology
- ECO 236. Health Policy
- ED 420. Legal Issues in Medicine and Education
- HIS 279. Health, Medicine, and Social Reform
- HIS 280. Changing Concepts of Disease
- PHL 225. Ethical Decisions in Medicine
- PSC 245. Aging and Public Policy
- PSY 283. Behavioral Medicine
- SOC 262. Medical Sociology
- CAS 392. Health Services Practicum
- CAS 394. London Internship in Medical Research

**Elective Courses**

Four from an extensive list available in the Center office.

**Senior Seminar**

(one course)

- CAS/SOC 301. Senior Seminar in Health and Society

After preliminary discussion with a staff member in the College Center for Academic Support, intended health and society concentrators should work with an advisor chosen from among the members of the Committee in developing their proposed course of study. Depending upon the student's special interests and future plans, a proposal might concentrate, for example, on the conceptual foundation of modern medicine; the politics, economics, and management of health care; biomedical ethics; or specific problems such as the elderly in modern society.

**REQUIREMENTS FOR A MINOR IN HEALTH AND SOCIETY**

The minor is intended for students who wish to apply the skills of their major concentration to the areas of medicine, health care administration, health policy and planning, or the social services. The minor will also be attractive to students who want to explore a secondary interest in the health field.

Five courses are required:
- CAS 116. Introduction to Community Medicine
- Four courses chosen from the following list:
  - ANT 216. Medical Anthropology
  - ECO 236. Health Policy
  - ED 420. Legal Issues in Medicine and Education
  - HIS 279. Health, Medicine, and Social Reform
  - HIS 280. Changing Concepts of Disease and Illness
  - PHL 225. Ethical Decisions in Medicine
  - PSC 245. Aging and Public Policy
  - PSY 283. Behavioral Medicine
  - SOC 262. Medical Sociology
  - CAS 392. Health Services Practicum

None of the courses included in the student's major may be counted toward the minor.

The minor is administered by the College Center for Academic Support, which is located in 312 Latimore Hall, and is supervised by the Health and Society Committee. Students who need help planning their minor program should seek advice from members of the Committee (listed above). The minor form must be submitted to the Center office for approval. At that time the student's minor program will be checked against the concentration program for overlaps. Students will be notified of their acceptance by mail.

Further information is available from the staff in the College Center for Academic Support.

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*Please note: Either CAS 392 or CAS 394 may be counted toward the core requirement. If both are taken, one must be designated as an elective.

**HISTORY**

Theodore M. Brown, Ph.D. (Princeton)  
Professor of History and of Community and Preventive Medicine

Stanley L. Engerman, Ph.D. (Johns Hopkins)  
Professor of Economics and of History

William B. Hauser, Ph.D. (Yale)  
Professor of History

Joseph E. Inikori, Ph.D. (University of Ibadan, Nigeria)  
Professor of History and of African and African-American Studies

*Richard W. Kaeuper, Ph.D. (Princeton)  
Professor of History

MacGregor Knox, Ph.D. (Yale)  
Professor of History

Christopher Lasch, Ph.D. (Columbia)  
Don Alonso Watson Professor of History and Chair of the Department

William J. McGrath, Ph.D. (California, Berkeley)  
Professor of History and Director of Undergraduate Studies

Brenda Meehan, Ph.D. (Rochester)  
Professor of History

Linda Peck, Ph.D. (Yale)  
Professor of History

John F. Waters, Jr., Ph.D. (Columbia)  
Professor of History

Mary Young, Ph.D. (Cornell)  
Professor of History

Celia Applegate, Ph.D. (Stanford)  
Associate Professor of History

Lynn D. Gordon, Ph.D. (Chicago)  
Associate Professor of Education and of History

*Elis Mandel, Ph.D. (Minneapolis)  
Associate Professor of History

Jesse T. Moore, Ph.D. (Pennsylvania State)  
Associate Professor of History

Stewart Weavet, Ph.D. (Stanford)  
Associate Professor of History

Robert Westbrook, Ph.D. (Stanford)  
Associate Professor of History

Adrianna Bakos, Ph.D. (Bryn Mawr)  
Assistant Professor of History

*Daniel Borus, Ph.D. (Virginia)  
Assistant Professor of History

*Jeffrey Burds, Ph.D. (Yale)  
Assistant Professor of History

*Alice Conklin, Ph.D. (Princeton)  
Assistant Professor of History

*Larry E. Hudson, Ph.D. (Keele)  
Assistant Professor of History

Mark Motley, Ph.D. (Princeton)  
Assistant Professor of Education and of History

*Has applied for one or two semesters of leave in 1993-94.
The Department of History offers programs of study leading to the B.A. degree and to the B.A. degree with honors (and, on the graduate level, to the M.A. and Ph.D. degrees). The department also offers a minor in history. Nonmajors are welcome in all history courses and often become enthusiastic, successful students of history while pursuing other vocations. The history concentration is valuable not only for secondary and university teaching, but also for careers in law and politics.

The Department offers a wide range of courses in its undergraduate program: social, economic, cultural, intellectual, political, and psychological approaches to historical problems and periods. Most 100- and 200-level courses in the Department are accessible to students with a wide variety of backgrounds. In addition, the faculty offers 300-level seminars and courses designed for concentrators or other students interested in exploring more specialized historical problems. With approval, selected seniors may take 400-level graduate seminars.

The Department offers three geographical areas of concentration (Europe, the United States, and the Third World). The Department maintains advisors in all three areas.

**Requirements for Concentration in History**

Before admission to concentration in history, students must satisfactorily complete at least two history courses. Students may then count these two courses toward fulfillment of the history concentration requirement, which consists of a total of 12 courses (or 48 credit hours), including:

- HIS 102–103 sequence (Survey of Western Civilizations). Normally this requirement will be satisfied in the freshman or sophomore year.
- Eight to 10 history courses (or 32 to 40 credit hours)—depending on the number of allied field courses—including one primarily concerned with the period before 1789 (satisfied by HIS 100, 101, or 102) and one with the period after 1789.
- Two to four courses in an allied field, of which at least two must be nonintroduction courses; that is, all courses in the first group must be nonintroduction courses.

- Political science; English, foreign languages, literatures, and linguistics; philosophy; psychology; and sociology are the most common allied fields.
- Five history courses (or 20 credit hours) in the student's geographical area of concentration (Europe, United States, or Third World).
- The junior seminar, described later.
- One additional seminar (a senior seminar, courses numbered HIS 29X, or a four or eight credit 300-level seminar).
- All of these specific requirements are included within the eight to 10 required courses.

**Requirements for Honors in History**

To graduate with honors in history, students must complete the concentration program described above and meet the following additional requirements:

- A departmental cumulative grade-point average of 3.2 or other demonstration of outstanding work in history.
- Satisfactory work in one 300-level history seminar in addition to the junior seminar.
- A distinctive essay of high quality, approximately 35 pages in length. The essay may be a seminar paper, further researched and suitably expanded, or it may be the product of HIS 393 (Senior Project). In addition to the student's advisor, a second reader will evaluate the essay.

**Requirements for a Minor in History**

- HIS 102. Survey of Western Civilizations I
- HIS 103. Survey of Western Civilizations II
- Four additional courses beyond the introductory level

The minor must include at least one course from two of the department's three areas of concentration: Europe, United States, and Non-Western. In addition, one of the six courses must be primarily concerned with the period before 1789 and one with the period after 1789.

**Other Departmental Regulations**

- Transfer students must take at least four courses in the Department, thus meeting half the concentration requirements in residence.
- No more than two courses in an approved summer school may count toward concentration credit; advisor's approval is necessary.

**Courses of Instruction**

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

**Europe**

**General**

102. Survey of Western Civilizations I. The forging of European society from the fall of Rome to 1789. (Fall)

103. Survey of Western Civilizations II. Europe's transition from traditional to modern society under the impact of the Industrial and French revolutions. (Spring)

**Ancient World to Renaissance**

152. Cultural History of Ancient Greece. Topics in the political, artistic, religious, and cultural history of ancient Greece from the Mycenaean to the "Golden Age."

209. High Medieval Europe. Europe from 1050–1300; economic, urban, and demographic growth; lords and peasants; spirituality, reform, and heresy; the emerging secular state; and "humanism" and "renaissance" in the High Middle Ages.


220. British History to 1485. Political, social, economic, and religious themes in the construction of medieval England from Arthur through the Tudors.

258. Jews, Pagans, and Christians in the Hellenistic Age. Same as REL 258.

292. Kingship and Law in Medieval Europe. Credit—4 hours. Justice and public order as factors in the creation of medieval states in France and England, ca. 1000–1300. (Fall)

**Modern Europe**


128. Russian Civilization. Study of Russian culture through an analysis of major themes and developments in Russian art, literature, music, and religion. Same as LIT 128.

129. History of Imperial Russia, 1689–1917. Survey of the major social, political, and economic developments of Imperial Russia in the eighteenth and nineteenth centuries.

200. Energy and the Environment, from the Death of Newton to the Birth of Atomic Physics. Analysis of the principal developments in the physical, geological, and biological sciences in the eighteenth, nineteenth, and early twentieth centuries, focusing on the growing understanding of energy and the environment. Major areas considered include the exploration of energy transformations within the maturing sciences of physics and chemistry, the coming of age of geology, physiology and evolutionary biology, the development of steam power in the Industrial
Revolution and its connection with the emergence of thermodynamics, and the dawning of ecology and atomic physics. Reciprocal relationships between the several sciences, between science and technology, and between science and society will be given special attention. No prerequisites. Ventures students only. (Spring)


215. European Cultural History, 1789-1848. The intellectual developments in Europe from 1789 to 1848, and the relationships among different fields of activity, such as philosophy, art, religion, and politics. (Spring)

216. European Cultural History, 1848-1900. This course explores the beginning of the disintegration of European liberalism and the emergence of basic elements of twentieth-century culture. (Fall)

217. Twentieth-Century European Cultural History. Artistic, philosophical, and psychological movements are examined within the context of the period's political and social upheavals. (Spring)

218. The Holocaust. Same as REL 218.

221. Age of Elizabeth. Analyzes the Elizabethan regime and its mythology, achieved despite foreign threat and internal upheaval. Readings include contemporary literature.


223. France, 1789-1870. Social and political analyses of France's revolutions and the formation of a class society.


225. Germany from Frederick the Great to William II, 1740-1914. The rise of the Prussian power-state, Bismarck's "unification" of Germany through blood and iron, and Germany's grasp at world power to August 1914. (Fall)

226. Hitler's Germany, 1914-1945. Germany in World War I, the collapse of the Weimar Republic, National Socialism from beer hall to European hegemony, and the destruction of German unity. (Spring)

228. France Since 1870. Credit—4 hours. Survey of French history from the founding of the French Republic to the present.

229. History of the U.S.S.R. The Bolshevik Revolution, with emphasis on the origins and development of economic, political, and cultural institutions from 1917 to the present.

230. Russian Religious Ideas. A history of Russian religious ideas and controversies from the tenth century to the present. Same as REL 230.

248. United Italy, 1861-Present. Italian politics and society from Cavour through Mussolini to Christian Democracy.

250. History of Modern Britain. Drawing on a variety of political, social, and literary material, this course explores the domestic history of the world's first modern nation.


270. The British Empire. A case study in the theory and practice of Empire from the eighteenth to the twentieth centuries.

282. Europe in the Twentieth Century. A survey of European society and politics in the age of democratic crises, total war, and reconstruction.

290. The Russian Revolution. Credit—4 hours. The course focuses on the Russian Revolution of 1917, the development of the revolutionary movement, and the construction of a socialist society, as well as the dismantling of that society in the revolution of 1991.

295. War in the Industrial Age, 1861-Present. Credit—4 hours. The evolution of warfare from 1861 to the present under the impact of industrial, scientific, social, and political change.

298. Europe Since World War II. Traces the economic and political integration of Western Europe and the rise and fall of Communism in Eastern Europe.

299. European Imperialism. Credit—4 hours. This course is a thematic introduction to the problem of European imperialism in the modern era, with particular attention to Great Britain and France.

UNITED STATES

134. European Discoveries of America in Film. Analyses of the accounts of the Vikings, Columbus, Hakluyt, etc., and films based in part on these primary documents.

140. The Western Hero. A textual and visual analysis of the "knight" archetype, the medieval morality play villain, and the western hero as seen in various film classics.


145. United States Since 1945. Some observers believed that the year 1945 marked the great American century—both domestic and foreign peace would prevail. Such was not the case. This course offers an in-depth view of the hopes and even more fears as American society marched toward the decade of the 1990s.

147. Early American History and American History and American Studies: The Classical Period, 1611-1840. The colonial and early national searches and creations of the "American" as reflected in myths, politics, and literature. Open to A.P. American history freshmen and all upperclassmen. Linked to ENG 147.

148. Indians and Other Americans. Interactions between North American Indians and Euro-Americans from colonial times to the present, including the development of Pan-Indian movements.

149. American Characters. American history through biography, group biography, and autobiography.

203. Religion in American Life. A historical examination of the Protestant, Roman Catholic, and Jewish experience within the American context. Same as REL 203.

205. American Economic Growth. Analysis of the main features of economic growth since 1800, recent statistical studies of national product, industrial structure, and capital formation are evaluated. Same as ECO 227.

207. Economics of Afro-American Slavery. The profitability and economic viability of the slave system and the effect of slavery on distribution of income as well as on the level and rate of growth of Southern per capita income. Prerequisite: ECO 101 or permission of the instructor. Same as ECO 228.


232. The Revolutionary Era, 1763-1800. From imperial reform to rebellion, confiscation, and federalism.


236. Recent America, 1929-1980. The First World War, the Great Depression, New Deal politics, and the super-power role of the United States at home and abroad.


285. America and the "Good War." The impact of World War II on the society and culture of the United States, particularly the effect of the traumatic events of the war—the Holocaust, Japanese internment, the dropping of the atomic bomb—on the American moral imagination.

287. History of the American South, 1792-1896. The South as it developed as a distinct cotton region. The structure of Southern society is analyzed in light of Gawn Wright's contention that cotton gave the South a social unity that it would not otherwise have had. The course looks at the many points in Southern history and assesses their impact on the several social groups which constituted Southern society.

288. History of the American South, 1896-1945. This course looks at the political and social relations which developed in the New South and examines the forces which gave the South its distinctiveness during this post-Civil War period. Explores the impact of events and processes such as industrialization, migration, World War I, and the Great Depression.

294. Protest Movements in Twentieth-Century America. Credit—4 hours. An examination of movements in twentieth-century America which had as their objective to exercise a degree of power over their destiny.

THIRD WORLD

AFRICA

202. The Third World. The origins of colonization and "underdevelopment" in the rise of European capitalism.

266. Colonial and Contemporary Africa. The course explores the impact of capitalism on African socioeconomic institutions during and after the era of formal colonialism. No prerequisites. (Fall)

297. Southern Africa: A History of Apartheid. Credit—4 hours. The interactions and conflicts between black Africans and Europeans from the time of permanent white settlements in Southern Africa to the present.

ASIA

105. The Asian Search for Self. Same as REL 105.

177. Traditional Japanese Culture. Exploitations in the cultural and institutional history of Japan from premodern to modern times. (Fall)

178. Traditional Chinese Civilization. Same as LIT 178 and REL 144.

276. Japan and Pearl Harbor, Japanese national security, Western imperialism and racism, and the economic, social, diplomatic, and political roots of the Pacific War.

277. Modern Japan. Japan's passage into modernity, industrialization, imperialism; war and the reconstruction of a new society since 1945. (Spring)

286. Film Images of War in Asia. Wartime and postwar U.S. and Japanese films with patriotic, racist, and humanistic themes, supplemented by novels, criticism, and history readings.

296. Women in East Asia: Japan, China, and Korea. A history of women in the family, women and work, women in society in three East Asian cultures. Same as WST 296.

MIDDLE EAST


264. Modern Jewish Thought. Same as REL 264.

278. Islam and the Third World. Same as REL 278 and AAS 278.

LATIN AMERICA

242. Economies and Societies of Latin America. Same as AAS 252.

INTERDISCIPLINARY AND GENERAL COURSES

275. World Politics Since 1941. The principal actors, forces, and currents in world politics from Hitler's failure to take Moscow and the attack on Pearl Harbor to the present.

290. The Origin of World Politics, 1890-1945. Credit—4 hours. International conflict from the opening up of the Far East in the 1890s to Hitler's destruction of European independence in 1941-45.

293. Strategy. The development of Western strategic thought from the Napoleonic wars to the present.

WOMEN AND THE FAMILY

150. History of Love. An analytical survey, beginning in classical antiquity, of ideas and practices concerning love, with emphasis on the relations between men and women. Eros (as opposed to agape) is the principal focus.

255. The Rise of the Modern Woman. The social, economic, and cultural roles of women in the development of modern eighteenth- and nineteenth-century society. Same as WST 201.

279. Health, Medicine, and Social Reform. Pursuit of the theme of public health and medical reform in leading writers, from different positions along the political spectrum, committed to the social and economic reorganization of modern society.

280. Changing Concepts of Disease. Historical account of the way disease has been conceived in the Western tradition. Emphasizes the scientific, epidemiological, philosophic, social, cultural, and professional forces that have shaped the development of this conception.

NOTE: There are also several 300-level seminars on women and the family.

THE JUNIOR SEMINAR

All majors are required to take the junior seminar during the spring term of their junior year. The seminar consists of several distinct courses, each with its own subject matter and meeting separately, but united by a common theme and by a series of common lectures. All of the seminars in any given year are devoted to one theme. These themes include such topics as revolution, cities, secularization, and decadence.
In general, the junior seminar addresses—in the context of concrete empirical study of particular periods and particular countries—the nature of historical scholarship, the relation of history to other disciplines, and the current state of the art. How are arguments about historical interpretation carried on? What is the difference between argument and proof? How does one decide among rival interpretations? What are the main concepts that guide social and historical analysis? Does historical scholarship need to become more theoretical? Has recent borrowing from the social sciences been beneficial or detrimental?

The junior seminar, then, is not a course in historiography or historical method but a broad-ranging course that explores central concepts in a comparative setting.

JUNIOR SEMINARS

303. The Junior Seminar: The City in History. Credit—4 hours. Important case studies in the making (and unmaking) of modern national identities. Revolutionary America, The Confederacy, Modern Ireland. Required course for juniors majoring in history. (With special permission, concentrators may take this course in the senior year.)

SPECIAL SEMINAR PROGRAM

The Department strongly urges every concentrator to take at least one 300-level (8-credit) seminar in his or her area of concentration. These special seminars, composed of a research scholar and about 10 carefully selected students, are intended as the culmination of the history concentrator's studies. They enable the student to engage in research under close and expert supervision, to participate in the investigation of important historical questions, and to present his or her research in an extensive essay.

307. Class and Ideology. Americans have never been comfortable with the concept of social class. This seminar examines the reasons for this reticence and some of its consequences.

310. Topics in Modern French History. An introduction to the field of modern French history between 1815 and 1914.

312. Topics in Medieval History. Selected problems in the political, social, and intellectual history of the Middle Ages.

313. Political Discourse in Early Stuart England: Kings, Courtiers, and Judges. Explores the divine right of kings, the role of the courtier, and the language of law; readings include plays, sermons, and political theory.

315. Historians and the German Problem. How historians (from Treitschke to the Historikerstreit) have analyzed Germany's unique place in the West; political contexts of historical debates on Germany's past.

316. Problems in Modern German Social and Political History. Critical issues in the development of a modern class society and in the shaping of political parties and institutions, from the disintegration of the Holy Roman Empire to the fall of the Weimar Republic.

317. Cultural History and Its Critics. Critical study of trends and problems in cultural history, focusing on central tensions within the field and external challenges from anthropology and literary theory.

318. Topics in Russian and Soviet History.


322. topics in Early Modern British History. Topics in the political, religious, legal, and cultural history of England, Wales, Ireland, and Scotland.

323. Twentieth-Century European Cultural History. Study of literary, political, psychological, and artistic innovations that established the foundations of twentieth-century culture.


355. Topics in the History of Women. The focus of this course changes from year to year to include both classic and new interpretations of such topics as feminism, women and work, women and revolution, women and social theory. Same as AAS 349.

356. The Black Family in Slavery and Freedom. This course traces the development of black family life through slavery and into freedom. The impact of factors such as economics, politics, and religion on the development of the black slave family is given special attention.

360. Fascism. Analysis of the fascist movements and regimes, and of the numerous interpretations of the fascist phenomenon.

361. Diplomacy and War in Europe, 1890–1945. The two German wars, the failure of the West in the interwar period, and the dwarfing of Europe.
368. Topics in the History of Medicine. Intensive readings, discussion, and research at the graduate level in topics in the history of medicine and public health.

369. Topics in the History of Science. Intensive readings, discussion, and research at the graduate level in topics in the history of science.

371. Evolution of the World Economic Order Since 1500. Deals with the economic relations between the developed and less developed parts of the world since the sixteenth century. Attention given to the impact of slavery and the slave trade upon Africa, Europe, and the Americas, and to the role of the overseas trade in European and American development and its impact on the rest of the world. Same as AAS 371 and ECO 371.

372. The Civil War. Examines the major events that led to the Civil War and considers the war's impact on the nation's political, social, and economic order.

373. North Africa and the Middle East in the Age of Imperialism. Credit—4 or 8 hours. The social, political, and economic consequences of the region's incorporation into the capitalist world economy from the early nineteenth century to the present. Same as AAS 373.

376. Women and History in Africa. Selected themes in the history of women in Africa, particularly issues related to women's incorporation into the capitalist world-economy. No prerequisites.

377. Studies in Modern Japan. Evolution of Japan as a modern state, with special emphasis on those forces that contributed to Japan's successful response to the West.


381. Topics in Nineteenth-Century American Cultural History. This course considers the decline of Calvinism, the rise of humanitarianism, and various critics of the new spirit of "improvement."

382. Topics in Twentieth-Century American Cultural History. Research seminar on selected topics in modern American cultural history.

384. The Food Crisis in Africa. Study of the meanings and origins of the crisis, with a focus on its relationship to transformations in gender, class, and systems of production and distribution in the age of imperialism.

385. The Atlantic Slave Trade and Africa, 1650–1850. The main thrust of the course shows the extent to which the Atlantic slave trade retarded the development of capitalism in Africa between 1650 and 1850, and so creating the conditions for the imposition of European colonial domination on the continent from the late nineteenth century. Same as AAS 375 and ECO 385.

OTHER PROGRAMS

300. Study Abroad. The Department participates in programs of study abroad. Complete details of these programs may be obtained from the Center for Study Abroad in 206 Lattimore Hall and/or the department advisor.

391. Independent Study. Credit—4 hours. Designed for junior and senior students who wish to pursue an independent reading program with a professor; it may also be used for readings in a 300-level seminar in which the student does not write the required essay and as such does not meet the 300-level seminar requirement, but it may be used as a distribution requirement within its area.

393. Senior Project. Credit—4 hours. May be an independent course with a faculty sponsor or may be taken in a 300-level seminar in which the student elects to write the essay but not to do all the required readings; as such it does not meet the 300-level seminar requirement, but it may be used as a distribution requirement within its area.

394. Internship in History. Experience in an applied setting supervised on site. Approved and overseen by a University instructor.

395. Internship in History. Experience in an applied setting supervised on site. Approved and overseen by a University instructor.

396. Washington Semester. Credit—8 hours. This course is mostly used by joint history-political science concentrators who are interning in Washington for one semester. This program is administered by the Department of Political Science.

INTERDEPARTMENTAL DEGREE PROGRAMS

Students whose educational interests do not fall within one of the existing departmental concentrations have opportunities for special degree programs through the College Center for Study Abroad and Interdepartmental Programs. In addition, the Center administers study abroad programs and the Senior Scholars Program.

INTEGRATED SCIENCES

No new concentrators will be admitted to this program after September 1, 1993. Students interested in this area should speak with an advisor in the Center for Study Abroad and Interdepartmental Programs in 206 Lattimore.
INTERDISCIPLINARY STUDIES

The College Center for Study Abroad and Interdepartmental Programs enables students to pursue educational goals that lie outside traditional disciplines and departments. Through its faculty-student Committee on Individualized Interdepartmental Concentrations, it supervises specially constructed programs leading to the B.A. degree. These include programs tailored to the specific needs of the individual student. In recent years these individualized concentrations have included such diverse areas as American studies, literature and illustration, and computers in media.

COLLEGE CENTER FOR STUDY ABROAD AND INTERDEPARTMENTAL PROGRAMS

CENTER STAFF
William Scott Green, Ph.D. (Brown) Dean of Undergraduate Studies; Professor of Religion and Philip S. Bernstein Professor of Judaic Studies
Jacqueline L. Levine Director
Heidi K. M. Kozierski Counselor
Silvia Skelac-Bird Advisor
Joan E. Gordon Secretary

COMMITTEE ON INDIVIDUALIZED INTERDEPARTMENTAL CONCENTRATIONS

Carlton Brett, Ph.D. (Michigan) Professor of Geology and Chair of the Committee
*William Scott Green, Ph.D. (Brown) Dean of Undergraduate Studies; Professor of Religion and Philip S. Bernstein Professor of Judaic Studies
Hans Reis, Ph.D. (New York) Professor of Psychology and Associate Professor of Education
Thomas DiPiero, Ph.D. (Cornell) Assistant Professor of French

PROGRAMS

The Concentration Programs—interdepartmental studies leading to bachelor’s degrees awarded by the College of Arts and Science. An interdepartmental M.A. or M.S. may also be arranged with the cooperation of the related departments.

Students who are interested in any of these programs are urged to discuss their plans with an advisor in the College Center for Study Abroad and Interdepartmental Programs, located in 206 Lattimore Hall.

A student seeking an individualized interdepartmental concentration should begin his or her planning no later than the second semester of the sophomore year. After discussion with two faculty members who agree to serve as advisors, the student prepares a proposal which contains the following information: (1) a statement indicating the reasons for the particular concentration and how it relates to the student’s educational and career goals, (2) a statement explaining why these goals cannot be met within an existing departmental concentration, (3) a listing of those courses that will make up the concentration (at least 10 in number), and (4) the names of two faculty members who have agreed to be advisors. Help in preparing the proposal is available in the College Center for Study Abroad and Interdepartmental Programs.

For example, one student who was considering either law or graduate school designed a concentration in American studies which included history courses in nineteenth- and twentieth-century America, courses in American literature and American politics from corresponding periods, together with supplementary courses in art and international studies.

Once a student’s proposal is complete, it is handed in to 206 Lattimore Hall and subsequently is submitted for action to the Committee on Individualized Interdepartmental Concentrations. In judging the proposal, the Committee considers the student’s academic goals and attempts to judge the coherence and thoughtfulness of the proposed program.

The bachelor’s degree with honors is awarded according to three criteria: (1) successful completion of 12 credits of honors coursework; two 4-credit independent study courses in the senior year, one devoted to honors research in the fall, and another devoted to thesis writing in the spring; and one 4-credit advanced-level course or seminar; (2) completion of a senior thesis; and (3) an oral defense of the thesis. Detailed information about the requirements is available in the College Center for Study Abroad and Interdepartmental Programs in 206 Lattimore Hall.

The bachelor’s degree with distinction is awarded to students with a sufficiently high concentration grade-point average: 3.25 for distinction, 3.50 for high distinction, and 3.75 for highest distinction.

It is possible for students to earn the degree with both distinction and honors.

NOTE: Proposals for concentrators must be submitted by mid-April of the junior year or before the end of the third semester preceding graduation.

INTERNATIONAL RELATIONS

COMMITTEE ON INTERNATIONAL RELATIONS

Charles M. Carlton, Ph.D. (Michigan) Professor of French and of Romance Linguistics
William B. Hauser, Ph.D. (Yale) Professor of History
John E. Mueller, Ph.D. (California, Los Angeles) Professor of Political Science and Chair of the Committee

The International Relations Certificate Program provides students with an opportunity to develop an interdisciplinary knowledge of international relations. The certificate is designed to supplement a disciplinary concentration taken by students in the social sciences or humanities. Those interested in the program must satisfy the requirements in their major field and in addition, submit a program that includes at least the following:

• Two courses in economics, two courses in history, and two courses in political science from among those listed under the heading, Primary Courses.

• Four courses from either the Primary Courses or Secondary Courses list, or four substitute courses approved by the student’s International Relations Program faculty advisor, of which up to two may be foreign language courses beyond 105.

In addition:

• No primary course may be taken satisfactory-fail and no more than one secondary course may be taken satisfactory-fail.

• Students must earn an overall grade-point average of at least 2.0 in courses submitted for the program.

The International Relations Certificate Program is administered through the College Center for Academic Support and students who plan to enroll in the program should pick up an application in the Center, which is located in 312 Lattimore Hall. The completed application, with approval indicated by the signature of the faculty advisor, should be returned to the Center no later than the first semester of the senior year.

Upon graduation, students successfully completing the International Relations Certificate Program will receive a certificate in international relations.
Please note that some courses are offered only in alternate years. Information about current offerings is available in 312 Lattimore, and definitive course listings are distributed prior to registration.

**PRIMARY COURSES**

**ECONOMICS**
ECO 108. Principles of Economics  
ECO 207. Intermediate Microeconomics.  
ECO 269. International Economics.  
ECO 270. International Finance.

**HISTORY**
HIS 195. Japan and Pearl Harbor  
HIS 197. Roots of the Middle East Crisis.  
HIS 202. The Third World.  
HIS 224. Europe from the French Revolution to World War I.  
HIS 228. France Since 1870.  
HIS 229. History of the U.S.S.R.  
HIS 242. Economies and Societies of Latin America.  
HIS 256. Europe and the Great War.  
HIS 266. Colonial and Contemporary Africa.  
HIS 273. World Politics Since 1941.  
HIS 276. Japan and Pearl Harbor.  
HIS 277. Modern Japan.  
HIS 278. Islam and the Third World.  
HIS 283. America and the Good War.  
HIS 295. War in the Industrial Age, 1861–Present.  
HIS 298. Europe Since World War II.  
HIS 316. Problems in German Social and Political History.  
HIS 325. The Age of Imperialism.  
HIS 354. State and Revolution in Southern Africa.  
HIS 360. Fascism.  
HIS 361. Diplomacy and War in Europe, 1890–1945.  
HIS 384. The Food Crisis in Africa.

**POLITICAL SCIENCE**
PSC 270. International Politics.  
PSC 272. Theories of International Relations.  
PSC 274. International Political Economy.  
PSC 277. Just and Unjust Wars.  
PSC 278. The War in Vietnam.

**SECONDARY COURSES**
A list of Secondary Courses is available in the College Center for Academic Support, 312 Lattimore Hall.
JUDAIC STUDIES

William Scott Green, Ph.D. (Brown)
Professor of Religion, Philip S. Bernstein
Professor of Judaic Studies and Director of
the Center for Judaic Studies

David Bleich, Ph.D. (New York University)
Professor of English and Professor in the
College of Arts and Science

Wilhelm Braun, Ph.D. (Toronto)
Professor
Emeritus of German Literature

Celia Applegate, Ph.D. (Stanford)
Associate
Professor of History

Ellen Koskoff, Ph.D. (Pittsburgh)
Associate
Professor of Musicology

Harold S. Wechsler, Ph.D. (Princeton)
Associate Professor of Education

Ayala Gabriel, Ph.D. (Rochester)
Assistant
Professor of Anthropology

*Ruth Kessler, M.A. (Arizona) Senior
Lecturer in Hebrew

*Jennifer Miller, M.A. (Rochester)
Instructor in Judaic Studies

The Center for Judaic Studies brings together faculty and students from across the University for collaborative study of Jews and Judaism in historical and cultural perspective. The range of research and teaching areas represented by the Center's affiliated faculty is distinctive in scope and unusual in breadth. The fields represented in the Center's work include: anthropology, archaeology, biblical studies, education, history, language and literature (both Hebrew and Yiddish), music, religion, visual studies, and women's studies.

The Center's philosophy is that learning about the Jews not only requires the perspective of multiple disciplines but also demands a balance of times and contexts. To ground its study in both past and present, for example, the Center sponsors and supports two complementary summer programs in the State of Israel: an archeological excavation of the first-century Galilean city of Yodefat and a program in contemporary Hebrew language and Israeli and Judaic culture at the University of Haifa. The Center also is engaged in developing a long-term project on Jewish learning in small- and medium-sized communities with the new Center for Jewish Education in the Diaspora at the University of Haifa and the Rochester Bureau of Jewish Education.

The Center offers an exciting new approach to Jewish studies in American higher education. It not only integrates Jewish history and culture into the mainstream of academic work, it also shows how that history and culture can serve as a constructive and critical lens to focus on key issues in the contemporary humanities and social sciences.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

100. Introductory Yiddish. Same as YDH 101.

101. Elementary Hebrew I. Same as HEB 101.

102. Intermediate Yiddish. Same as YDH 102.

103. Elementary Hebrew II. Same as HEB 102.

104. Intermediate Hebrew. Same as HEB 103.

188. Hebrew through Conversation. Same as HEB 204.

218. The Holocaust. Same as REL/HIS 218.

224. The Jew in American Popular Culture. This course is designed to introduce students to the presentation of Jews in contemporary American films and television programs. The focus is on visual texts that are about Jewish people or have Jewish themes. We also explore the reception of these texts by audiences and the criticism they provoked in various print media.

247. Israeli Politics and the Middle East Conflict. Same as ANT 247/REL 275.

264. Modern Jewish Thought. Same as REL/HIS 264.

289. Literature of the Shtetl. Same as REL 289.

370. Literature and Jewish Identity. Same as ENG/LIT 370.

COMMITTEE ON MANAGEMENT STUDIES

K. Ruben Gabriel, Ph.D. (Hebrew University) Professor of Statistics

William Scott Green, Ph.D. (Brown) Dean of Undergraduate Studies; Professor of Religion, Philip S. Bernstein Professor of Judaic Studies

Ronald Hansen, Ph.D. (Chicago) Associate Dean of Academic Affairs, William E. Simon Graduate School of Business Administration

Michael Wolkoff, Ph.D. (Michigan) Senior Lecturer in Economics and in Public Policy and Chair of the Committee

REQUIREMENTS FOR A CERTIFICATE IN MANAGEMENT STUDIES

For certification, students must complete the six management courses with a GPA of 2.5. No course may be taken pass/fail; ordinarily, no transfer credit without preapproval for specific courses is allowed, although students may petition for transfer credit just as they may for the substitution of specific courses in their chosen track.

Six courses are required:

1. STT 211 or 165 (prerequisite for STT 165; MTH 141) or another appropriate statistics course

2. CSC 108, CSC 181, or EE 171

3. ECO 207. Intermediate Microeconomics (as preparation for this course students may be advised to take ECO 108)

4. ACC 201. Principles of Accounting

5. Two courses from one of the following tracks:

a. Production:
   • OMG 231. Operations Management (required)
   • PSY 353. Human Factors
   • MTH-STT 207. Linear Programming and the Theory of Games
Of the two courses required for this track, one must be from the Simon School offerings.

This track emphasizes production analysis and leads to careers in production planning, quality control, inventory management, and other jobs involving managing the production of goods and services.

b. Marketing:
- MKT 203. Principles of Marketing
- MKT 213. Marketing Projects and Cases
- ECO 231. Industrial Organizations: Theory and Evidence
- STT 221. Sampling Techniques

This track emphasizes the distribution and sale of goods and services and leads to careers in sales, marketing research, consumer relations, and others having to do with marketing goods and services.

c. Public Sector Analysis:
- LAW 205. Business Law
- ECO 234. Regulation of Economic Activity
- ECO 236. Health Policy
- ECO 261. State and Local Public Finance
- ECO 263. Public Finance and Fiscal Policy
- PSC 237. Domestic Social Policy
- PSC 245. Aging and Public Policy

Qualified undergraduates with the approval of the Committee's Simon School advisor may substitute BPP 440, Public Economics, for any course in the track. ECO 238, Economics of Energy, is recommended for students desiring additional coursework.

This track leads to jobs involving the natural resources, government regulations, and relations between various agencies.

d. Personnel Management:
- BSI 241. Fundamentals of Personnel Administration
- ECO 223. Labor Markets
- PSC 235. Organizational Theory and Behavior
- PSY 262. Human Motivation and Emotion
- PSY 264. Psychology of Business and Industry

Leading to careers such as personnel relations, benefits counseling, public relations, and staff recruiting, this track offers a flexible introduction to the many positions in personnel offices.

e. Accounting/Finance:
- ACC 221. Cost Accounting
- FIN 205. Financial Management
- ECO 211. Money, Credit, and Banking
- ECO 216. Financial Markets: Concepts and Institutions
- ECO 248. Risk and Insurance

Of the two courses required for this track, one must be from the Simon School offerings.

NOTE TO ECONOMICS MAJORS: FIN 203 cannot be used as an elective in your ECO concentration if ECO 216 or 217 have been taken for the major.

This track leads to careers with banks, investment firms, benefits offices, and other places that analyze and record business transactions. Students may wish to supplement their work with other courses in financial theory or public economics. ECO 263 and 265 are recommended for additional coursework.

f. Information Systems:
- CIS 225. Data Management
- CSC 220. Data Structures
- MTH 220. Discrete Mathematics

This track prepares students to make sound business decisions regarding the use of computer technology. This understanding is achieved through a survey of computing topics including hardware and software, programming, systems analysis, and information management with emphasis on practical applications in the business environment.

Students also have the option of completing any two track courses for a Certificate in Management Studies with no specific track designation.

Upon graduation, students successfully completing the management studies program will receive a certificate in their departmental diploma ceremony.

**MATHEMATICS**

Norman Larrabee Alling, Ph.D. (Columbia)  Professor of Mathematics
Frederick R. Cohen, Ph.D. (Chicago)  Professor of Mathematics
Samuel Girler, Ph.D. (Princeton)  Professor of Mathematics
John Robb Harper, Ph.D. (Chicago)  Professor of Mathematics and Chair of the Department
Richard Bengt Lawne, Ph.D. (M.I.T.)  Professor of Mathematics
Saul Lubkin, Ph.D (Harvard)  Professor of Mathematics
Richard Mandelbaum, Ph.D (Princeton)  Professor of Mathematics
John Moore, Ph.D. (Brown)  Adjunct Professor of Mathematics
Joseph Neisendorfer, Ph.D. (Princeton)  Professor of Mathematics
Arnold Pizer, Ph.D. (Yale)  Professor of Mathematics and Associate Chair of the Department
David Donald Prill, Ph.D. (Princeton)  Professor of Mathematics
Ralph Alexi Raimi, Ph.D. (Michigan)  Professor of Mathematics
Douglas C. Ravenel, Ph.D. (Brandeis)  Professor of Mathematics
Sanford Leonard Segal, Ph.D. (Colorado)  Professor of Mathematics
Norman Stein, Ph.D. (Cornell)  Professor of Mathematics
Michael Cranston, Ph.D. (Minnesota)  Associate Professor of Mathematics
Michael E. Gage, Ph.D. (Stanford)  Associate Professor of Mathematics
Steven Mark Gonek, Ph.D. (Michigan)  Associate Professor of Mathematics
Allan Greenleaf, Ph.D. (Princeton)  Associate Professor of Mathematics
Martin Guest, Ph.D. (Oxford)  Associate Professor of Mathematics
Carl Mueller, Ph.D. (California, Berkeley)  Associate Professor of Mathematics
Adrian Nachman, Ph.D. (Princeton)  Associate Professor of Mathematics
Nickolas Backscheider, Ph.D. (Purdue)  Assistant Professor of Mathematics
Carol Bezuidenhout, Ph.D. (Minnesota)  Assistant Professor of Mathematics
Yi Li, Ph.D. (Minnesota)  Assistant Professor of Mathematics
Norman Gustav Gunderson, Ph.D. (Cornell)  Professor Emeritus of Mathematics and of Education

*Part-time.*
Johannes Henticus Bernardus Kemperman, Ph.D. (Amsterdam) Emeritus of Mathematics
Leonardo Nachbin, Ph.D. (Rio de Janeiro) Emeritus of Mathematics
George Eastman Emeritus of Mathematics
Arthur Harold Stone, Ph.D. (Princeton) Emeritus of Mathematics
Dorothy Maharam Stone, Ph.D. (Bryn Mawr) Emeritus of Mathematics
Charles Edward Watts, Ph.D. (California, Berkeley) Emeritus of Mathematics
Professor Emeritus of Mathematics
Teaching assistants are used to supervise recitation and review sections of freshman and sophomore courses.
NOTE: Approximately 15 percent of the faculty may be on leave in a given academic year.

The Department of Mathematics offers the B.A., B.S., M.A., M.S., and Ph.D. degrees.

Mathematics today is one of the most pervasive modes of thought—indeed a striking intellectual phenomenon of the past several decades is the utilization of mathematics in fields far removed from the traditional ones of the physical sciences and engineering. Some of this mathematics is "new," invented by mathematicians and others for the purpose of mathematical study of a new field, as, for example, mathematical game theory and economics; some of it depends on new technology, as with computerized taxonomy or mathematical simulation of biological systems; some of it is "old," finding new uses, such as the mathematical study of epidemics and birth-and-death processes. Mathematics has even found applications in fields as seemingly remote as political science and anthropology. In turn, each new area of application is an additional stimulus to mathematics itself. The offerings of the Department of Mathematics are intended to reflect this diversity.

Students planning to concentrate in almost any of the University's liberal arts programs, in addition to those which require some college mathematics, will find one or more courses or sequence offerings in the Department of Mathematics a valuable complement to their field of interest. Students are urged to consult the departmental advisors of both mathematics and their own intended area of concentration about courses in mathematics which may be useful for their educational and career goals, and to begin the necessary or recommended courses as early as possible.

COURSE INFORMATION
There are three freshman-sophomore sequences in calculus:
- Students in the physical and engineering sciences normally choose the sequence MTH 161, 162, 163, 164. MTH 161 is offered every fall and MTH 162, 163, and 164 are offered every semester.
- The sequence MTH 141, 142, 143, 163, 164 is intended for students who require a less fast-paced calculus sequence than MTH 161, 162. The three courses MTH 141, 142, 143 contain all of the material of MTH 161, 162 and prepare students for MTH 163 and 164. These courses are offered each semester.
- The first of these sequences may be entered with advanced standing and credit by students who do sufficiently well on a College Entrance Examination Board advanced placement examination. MTH 163 and 164 may be taken in either order. Usually MTH 164 (Multidimensional Calculus) is taken first since its subject matter is more closely related to MTH 162. However, some engineering majors require MTH 163 (Differential Equations) to be completed by the end of the fall semester of the sophomore year.
- The sequence 171, 172, 173, 174 is an honors calculus sequence for talented students interested in mathematics. The sequence emphasizes the theoretical understanding of calculus in addition to teaching technical skills. Five credits will be granted for each course satisfactorily completed instead of the usual four credits. Mathematics concentrators who complete all four semesters will, on the approval of their advisor, be excused from the requirement to take MTH 200 and MTH 235.

Care is taken to ensure correct placement in the appropriate mathematics sequence during freshman orientation. Placement is based upon high-school background and national and University placement tests. In addition, once classes have begun, students may choose, or the instructors may advise, transfer to a more suitable sequence when considered appropriate.

MTH 130 is an introductory course especially recommended for students intending to pursue concentrations in the humanities.

CONCENTRATION PROGRAMS
In addition to a B.A. concentration in mathematics and a B.S. concentration in applied mathematics, the Department offers a program in secondary mathematics education, and two undergraduate concentration programs in computer sciences. There also is a joint concentration program in mathematics and statistics, details of which are given under statistics.

THE B.A. IN MATHEMATICS
The B.A. concentration requires, in the 10-course group known as "the major," six to eight mathematics courses numbered 200 or higher, of which MTH 200, 235, 236, and 265 are specified. Of these, MTH 200 must be completed by the end of the first semester of concentration, that is, by the end of the first semester of the junior year in virtually all cases. It is recommended that students intending to concentrate in mathematics complete MTH 200 and 235 by the end of their sophomore year. In addition, a fourth course, in analysis or applied mathematics, must be chosen from MTH 201, 263, 266, 280, 281, 282, or 288. The other one to three mathematics courses are electives, according to the interests of the student, and the balance of the 10 nonelementary courses constituting the major must be chosen from a department-approved allied field. Since the "allied field" requirement in a mathematics concentration is minimal, students are urged to consult departmental advisors concerning suitable coursework, even in elective fields of study which seem at first glance to be quite distant from mathematics.

The entire proposed major is usually worked out with departmental advice during the spring of the sophomore year. It may be revised and should be reviewed yearly with a departmental advisor.

Sample Programs and Advice
Students intending graduate work in mathematics should consider MTH 237, 266, and
suitable 400-level graduate courses as electives. Students who plan to use mathematics in a physical science or engineering are urged to consider MTH 201, 206, 281, and 282 as electives. Students intending graduate work in economics, business administration, or operational mathematics, or work in a field such as systems analysis, are urged to consider MTH 201, 202, and 207. Students particularly interested in computer science should elect MTH 288 and EE 200, noting that either CSC 181 or EE 171 is an elementary prerequisite to later work in computer science; consideration should particularly be given to MTH 280, 286, and other cross-listed courses as electives.

The 10 courses which constitute one of the concentrations in mathematics do not exhaust the student's time in the junior and senior years. Prospective graduate students in mathematics, for example, would do well to learn to read a foreign language (French, German, or Russian). Other mathematical careers involve considerable preparation in (among others) areas such as physics, biology, engineering, and economics.

Below are some typical examples of concentration programs. These are intended as suggestive, not prescriptive.


Secondary Education

The secondary education concentration is designed to prepare teachers of secondary school mathematics. It includes the Teacher Education Sequence in secondary school mathematics offered in the Graduate School of Education and Human Development and eight (rather than 10) courses numbered 200 or higher in mathematics and a department-approved allied field. Six or more of the eight must be in mathematics, including MTH 200, 235, 236, and 265. Electives may be chosen at will, but prospective teachers are advised to elect, where possible, courses in logic, geometry, theory of numbers, and computer science.

A typical program might be as follows: MTH 200, 201, 216, 230, 235, 236, 253, 265. Allied field: statistics; also, the Teacher Education Sequence in the Graduate School of Education and Human Development.

THE B.A. IN COMPUTER SCIENCES: MATHEMATICS
1. Basic courses:
   • CSC 181. Introduction to Computer Science
   • MTH 161, 162, 163, 164. (Any equivalent sequence may be substituted.)
3. Six additional courses at the 200-level or above of which CSC 220 is required.

Three of these additional courses must be chosen from courses cross-listed in mathematics and computer science. The others are to be selected from courses in mathematics and computer science, or from other approved offerings. Modifications in consultation with the student's advisor are possible.

THE B.S. IN COMPUTER SCIENCES: APPLIED MATHEMATICS

Students entering this program are expected either to have the equivalent of a year of calculus (at least at the level of MTH 161-162) or of a semester of calculus and one of computing (at the level of CSC 181). Students not having these prerequisites are urged to consider the B.A. in computer sciences—mathematics (just described) which forms an adequate background for either graduate school in computer science or employment. Students planning immediate employment should consider taking at least one of the mathematical modeling courses MTH 218, MTH 219, in their program.

The B.S. program involves core courses in mathematics and computer sciences and electives.

1. Core Courses (computer sciences):
   • CSC 181. Introduction to Computer Science or EE 171. Introduction to Computer Engineering (or equivalent)
   • EE 200. Computer Architecture One of:
   • CSC 206. Non-Numerical Computing
   • CSC 220. Data Structures
2. Core Courses (mathematics):
   • MTH 161, 162, 163, 164. (Any equivalent sequence may be substituted.)
   • MTH/STT 201. Introduction to Probability
   • MTH 235. Linear Algebra
   • MTH 263. Ordinary Differential Equations or MTH 236. Introduction to Algebra I
   • MTH 265. Functions of a Real Variable I
   • MTH 281. Introduction to Fourier Series, Orthogonal Polynomials, and Boundary Value Problems
   • MTH 282. Introduction to Complex Variables with Applications

(MTH 173-174 may be taken instead of MTH 163-164; in this case MTH 235 is waived.) These core requirements may be modified in consultation with the student's advisor. Students are also strongly advised to take the extra-credit computer labs offered by the mathematics department.

2. Elective courses: Students should take at least six (preferably seven) of the following courses not previously taken:
   • EE 201. Computer Organization
   • CSC 220. Data Structures
   • CSC 240. Introduction to Artificial Intelligence
   • MTH/CSC 238. Combinatorial Mathematics
   • MTH/CSC 248. Theory of Graphics
   • MTH/CSC 280. Introduction to Numerical Analysis
   • MTH/CSC 286. Introduction to the Theory of Computation
   • MTH/CSC 288. Design and Analysis of Computer Algorithms
   • MTH 220. Discrete Mathematics
   • MTH 236. Introduction to Algebra I
   • MTH 263. Ordinary Differential Equations

Again, modifications in consultation with the student's advisor are possible.

THE B.S. IN APPLIED MATHEMATICS

Freshman and Sophomore Years

1. Mathematics Core:
   • MTH 161-164 or 171-174: A four-semester calculus sequence
   • MTH 218 or MTH 219: An introduction to mathematical models
   • MTH 163-A: Computer lab in calculus and differential equations is strongly recommended.

2. Related Technical Fields:
   Four courses including at least one of the following sequences: PHY 121, 122, 123 (or equivalent), or EE 200-201. Computer Systems. To satisfy the remainder of this requirement, students will normally choose, in consultation with their advisor, from among selected lower-level undergraduate courses in mathematics-related departments. * All students enrolled in this program will be required to demonstrate proficiency in a high-level computer language (e.g., FORTRAN or Pascal): CSC 181 is strongly recommended and would count as one of the four courses required in this category.

*These departments include biology, chemical engineering, chemistry, computer science, economics, electrical engineering, mechanical engineering, physics, and statistics. (A detailed list of appropriate courses is available on request.)
Junior and Senior Years

1. Mathematics Core:
   - MTH 201: Introduction to Probability
   - MTH 235: Linear Algebra (Waived if 171–174 are completed.)
   - MTH 263: Ordinary Differential Equations
   - MTH 265: Functions of a Real Variable
   - MTH 281: Fourier Analysis and Partial Differential Equations
   - MTH 282: Introduction to Complex Variables with Applications
   - MTH/CSC 280: Numerical Analysis

2. Related Technical Fields:
   - Three courses at the nonintroductory level.
   - Students will normally choose, in consultation with their advisor, from among selected upper-level undergraduate courses in mathematics-related departments.*

   * In addition, these requirements can be satisfied by appropriate graduate courses.

The student's advisor will work with each student to set up individual programs of study following specific tracks (e.g., bio-mathematics, computing, engineering, mathematical economics, mathematical physics, statistics, and operational mathematics). Among their electives, students are required to take at least four courses in either mathematics or related technical fields including at least one course in computing.

MINORS

The Department offers a minor in probabilistic mathematics. The minor consists of five courses beyond MTH 161–162 or equivalent.

1. At least one of:
   - MTH 163, Ordinary Differential Equations I
   - MTH/STT 201, Introduction to Probability

2. At least three courses from among:
   - MTH/STT 202, Introduction to Stochastic Processes
   - MTH/STT 203, Introduction to Mathematical Statistics
   - MTH/STT 207, Linear Programming and the Theory of Games
   - MTH 219, Introduction to Mathematical Models in Social and Life Sciences A
   - MTH 219, Introduction to Mathematical Models in Social and Life Sciences B

The group of three will be chosen by the student after a consultation with a member of the undergraduate advisory committee.

Examples

1. A student interested in mathematical modeling might take one of 163, 164 and further 201, 202, 218, and 219.

2. A student with primary interest in probability might take 164, 201, 202, 203, and 207.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years.

Definitive course listings are distributed prior to registration.


140. Pre-Calculus. Credit—2 hours. For students who lack the algebra and trigonometry skills needed to perform successfully in beginning calculus courses. Successful completion of the course will be measured by a series of tests. Failed tests must be repeated until passed. Help sessions and practice sessions will be scheduled regularly throughout the course. Students arrange class times with instructor. Not available for audit. (Fall and Spring)

141–143. Calculus I–III. A three-semester sequence identical in content with the two-semester sequence MTH 161, 162 described below. (Fall and Spring)

161. Analysis I. Analysis of the elementary real functions: algebraic, trigonometric, exponential, and their inverses and composites. Their graphs, derivatives, and integrals. Mean value theorem, maxima and minima, curve plotting. The fundamental theorem of calculus, with geometric and physical applications. (Fall)

161A. Computer Lab I. A computer lab designed to complement the standard department offering MTH 161. The lab is self-contained and may also be taken by someone not concurrently taking MTH 161. Topics selected from: numerical representation; round-off and truncation error; loss of significant digits by cancellation; limits and convergence; evaluation of functions; conditioning and stability, curve plotting; numerical differentiation; roots of equations; maxima and minima of functions; numerical integration; interpolation techniques. No prior knowledge of programming is required. However, a student not previously exposed to computers is advised to take the Computer Center mini-course, Introduction to Computing I (six classes), concurrently. MTH 161A is not a prerequisite. (Spring)

NOTE: Either MTH 164 or MTH 163 can be taken after MTH 162 or MTH 143. The usual procedure would be to take MTH 164 followed by MTH 163 but see Course Information above.

163. Ordinary Differential Equations I. Elementary methods, linear equations, and systems with constant coefficients, solutions in series, special functions, phase plane analysis and stability, Laplace transform, extremal problems. Prerequisite: MTH 143, 162, or 172. (Fall and Spring)

163A. Computer Lab III. A computer course designed to both complement and supplement the differential equations course, MTH 163. This course uses microcomputers to achieve a better understanding of the qualitative behavior of solutions of differential equations. Special emphasis is placed on solution of real problems from engineering or physics. Two-dimensional systems of equations and their phase-plane pictures are introduced. Numerical techniques and error estimates. Especially recommended for science and engineering majors. No prior knowledge of programming is required. However, a student not previously exposed to computers is advised to take the Computer Center mini-course, Introduction to Computing I (six classes), concurrently. Neither MTH 163 nor other computer labs are prerequisites. (Spring)

164. Multidimensional Analysis. Differentiation and linear approximation, extrema, Taylor series. Line, surface, and volume integrals: coordinate changes, Jacobians. Divergence theorem, Stokes' theorem. Determinants and matrices in N-dimensional vector spaces. Prerequisite: MTH 143, 162, or 172. (Fall and Spring)
171–174. Analysis Ia–IVa. Credit—5 hours for each course in the sequence. An honors sequence covering the material of MTH 161, 162, 163, and 164 in greater depth from the standpoint of both theory and applications. Consent of Department required.

190. The Mathematical Experience. Designed to offer some picture of what mathematics is, why anyone does it, and how it is done, for students with no professional need for mathematics. No technical background is necessary. The course tries to place mathematics in a cultural and intellectual setting by examining samples of mathematics, by studying the lives of mathematicians, and reading the writings of mathematicians and others on mathematics.

200. Transition to Advanced Mathematics. Introduces some of the basic techniques and methods of proof used in mathematics and computer science. Methods of logical reasoning, mathematical induction, relations, functions, and more. The course concludes with an application of the techniques learned to either group theory or real analysis. (Fall and Spring)

201. Introduction to Probability. Probability spaces; combinatorial problems; random variables and expectations; discrete and continuous distributions; generating functions; independence and dependence; binomial, normal, and Poisson laws; laws of large numbers. Prerequisite: MTH 162 or equivalent; MTH 164 recommended. Same as STT 201. (Fall and Spring)


203. Introduction to Mathematical Statistics. Principles of statistical decision theory, point and interval estimation, tests of hypotheses, multivariate normal distribution, linear hypotheses, selected topics. Prerequisite: MTH 201. Same as STT 203. (Spring)

207. Linear Programming and the Theory of Games. The basic properties of convex sets. Linear programming. Duality. Principal theorems. Finite games. Some infinite games. Prerequisites: MTH 164 or equivalent and at least one of: MTH 235, 265, or 174. Same as STT 207.

215. Chaos, Fractals, and Computer Graphics. The course surveys fractal geometry with applications to chaos theory and related computer software. Prerequisites: MTH 142, 162, or 172 or permission of instructor. Same as CSC 215.

216. Mathematical Logic I. Propositional calculus, functional calculus of first and higher order, the decision problem, consistency, completeness. Same as CSC 216 and PHL 216.

218. Introduction to Mathematical Models in Social and Life Sciences A. Both MTH 218 and MTH 219 are aimed at building problem-solving ability in students through the development of mathematical models for certain real-life situations in the social and biological sciences. MTH 218 concentrates on axiomatic models and those involving autonomous systems of differential equations. Topics are selected from biology and political science, including voting theory and Arrow's Theorem. Independent of MTH 219. Prerequisite: MTH 162 (MTH 163 is recommended).

219. Introduction to Mathematical Models in Social and Life Sciences B. Both MTH 218 and MTH 219 are aimed at building problem-solving ability in students through the development of mathematical models for certain real-life situations in the social and biological sciences. MTH 219 concentrates on probabilistic models, and includes all necessary elementary probability theory. Linear programming and utility theory are also discussed. Topics are mostly selected from biology and economics. Independent of MTH 219. Prerequisite: MTH 162.

220. Discrete Mathematics. Introduces some of the basic mathematical ideas used in computer science. Methods of logical reasoning, mathematical induction, binary relations, and more. Some applications to program verification and analysis of the complexity of algorithms is included. Recommended for majors in computer sciences: math, and computer sciences: applied math. (Fall)

230. Theory of Numbers. Divisibility, primes, congruences, quadratic residues and quadratic reciprocity, primitive roots, elementary prime number theory.


235. Linear Algebra. Finite-dimensional vector spaces over R and C axiomatically and with coordinate calculations. Forms, linear transformations, matrices, eigenspaces. This course may be taken concurrently with MTH 164. (Fall and Spring)

236. Introduction to Algebra I. An introduction to basic algebraic structures, groups, rings, fields, with applications to specific examples. Prerequisite: MTH 235, taken previously or concurrently, is recommended. (Fall and Spring)

237. Introduction to Algebra II. Continuation of MTH 236. (Spring)

238. Combinatorial Mathematics. Permutations and combinations; enumeration through recursions and generating functions; Polya's theory of counting; finite geometrics and block designs; counting in graphs. Same as CSC 238.

239. Introduction to Algebraic Number Theory. Gaussian integers and sums of two squares, quadratic fields and binary quadratic forms, arithmetic of quadratic fields, including factorization of ideals, class numbers, and fundamental units. Prerequisite: either MTH 230 or 236.


243. Introduction to Topology. Classification of surfaces, knot theory, the fundamental group. Prerequisites: MTH 236 and 265.

247. Theory of Sets. Sets, relations, mappings; equivalence, order, cardinals, ordinals, transfinite arithmetic, axiom of choice and equivalents.


250. Introduction to Geometry. Foundations of geometry, isometry, similarity, invarions; introduction to affine, projective, and various non-Euclidean geometries. (Fall)

253. Projective Geometry. Projective and affine planes, theorems of Desargues, Pappus, Pascal. Cross ratio, collineations, coordinates, conics, duality. Prerequisites: MTH 164 or 174. MTH 235 recommended. (Spring)

255. Differential Geometry I. Torsion, curvature, the differential geometry of curves and surfaces in 3-space. Prerequisite: MTH 164 or 174. (Fall)

256. Differential Geometry II. Riemannian geometry. Prerequisite: MTH 255. (Spring)

263. Ordinary Differential Equations. A second course in ordinary differential equations in the real domain. Prerequisite: MTH 163 or equivalent and MTH 235, or consent of the instructor.

265. Functions of a Real Variable I. Real number system, uniform continuity, mean value theorems, bounded variation, Riemann-Stieltjes integral, sequences of functions. Prerequisites: MTH 163 and 164, or 174, or equivalent. (Fall and Spring)
266. Functions of a Real Variable II. Differential-forms, implicit functions, functional dependence, transformations of multiple integrals; arc length, surface area; differential forms, vector analysis. Prerequisite: MTH 265. (Spring)


280. Introduction to Numerical Analysis. The numerical solution to mathematical problems by computer. Linear systems, approximation, integration, and differential equations. Floating point arithmetic and consequence pitfalls of computation. Prerequisite: MTH 162 or equivalent. Same as STT 280 and CSC 280. (Spring)

281. Introduction to Fourier Series, Orthogonal Polynomials, and Boundary Value Problems. Fourier series and convergence theorems. Orthogonal polynomials. Applications to some partial differential equations. Fourier transforms. Prerequisites: MTH 163 and 164 or 174, Equivalent to ME 201. (Fall)

282. Introduction to Complex Variables with Applications. Complex differentiation and integration, analytic functions, singularities, residues, poles, series expansions, conformal mapping, with some applications. This course is independent of MTH 281. Prerequisite: MTH 164 or 174. Equivalent to ME 202. (Spring)

286. Introduction to the Theory of Computation. Introduction to automata theory, formal languages, computability, and computational complexity. Prerequisites: MTH 162 and CSC 220. Same as CSC 286. (Offered in alternate years with MTH 288.) (Spring)

288. Introduction to Design and Analysis of Computer Algorithms. Introduction to general data structures and programming techniques for the design of time- and space-efficient algorithms. Prerequisites: CSC 220 and MTH 162. Same as CSC 288. (Offered in alternate years with MTH 286.) (Spring)

300. History of Mathematics. The nature and style of mathematics in ancient Babylonia, Egypt, and Greece; medieval and Renaissance Europe; seventeenth-century Europe; and some aspects of the development of abstraction and rigor in analysis and set theory since 1700. Some of the actual methods and problems of the era studied are part of the material of the course.

305. Music and Mathematics. A seminar course exploring the relations between the two arts. The topics may be chosen from combinatorics, group theory, serialism, atonalism, mathematical acoustics, computer composition, etc. Prerequisite: consent of the instructor.

333. Surreal Numbers. A seminar on numbers (in the new treatment of John Conway) designed to expose students to the creative aspect of mathematics and to help develop the ability to do independent work in mathematics.

391. Independent Study in Mathematics. Special work arranged individually.

Graduate-level courses (400 and 500 level) are open to qualified undergraduates with permission of the instructor. Among these are:

430. Number Theory. An introduction to number theory. The emphasis is on algebraic or analytic number theory in alternate years. Algebraic topics include valuations, ideals and units, class groups, etc. Analytic topics may include prime number theory, sieves, modular forms, etc.

436. Algebra I. Rings and modules, group theory. Galois theory. Prerequisite: MTH 237. (Fall)

437. Algebra II. Multilinear algebra, quadratic forms, simple and semi-simple rings and modules. Prerequisite: MTH 436. (Spring)

440. General Topology I. Continuity. Compactness, connectedness, metrizability. Product spaces. Prerequisite: MTH 265. (Fall)

443. Algebraic Topology I. The combinatorial structure of complexes and the homology of polyhedra. Applications of algebraic techniques in topology to classification of surfaces, fixed point theory, and analysis. Prerequisites: MTH 436 and 440. (Spring)


467. Theory of Analytic Functions I. Cauchy theorems, Taylor and Laurent series, residues, conformal mapping, analytic continuation, product theorems. Prerequisite: MTH 265 or equivalent. (Fall)


A more detailed description of other graduate-level courses may be found in the Official Bulletin: Graduate Studies.

MUSIC

**Kim H. Kowalke, Ph.D. (Yale) Professor of Music and Chair, College of Arts and Science, and of Musicology, Eastman School of Music**

Ellen Koskoff, Ph.D. (Pittsburgh) Associate Professor of Musicology, Eastman School of Music

*Carl J. Atkins, D.M.A. (Eastman School of Music) Assistant Professor of Music, College of Arts and Science; Conductor, Symphonic Wind Ensemble*

Kathleen Grant, D.M.A. (USC) Assistant Professor of Music and Director of Choral Activities, College of Arts and Science

Daniel G. Harrison, Ph.D. (Yale) Assistant Professor of Music, College of Arts and Science, and of Music Theory, Eastman School of Music

Massimo M. Ossi, Ph.D. (Harvard) Assistant Professor of Music, College of Arts and Science and of Musicology, Eastman School of Music

Paul Burgett, Ph.D. (Eastman School of Music) Adjunct Associate Professor of Music, College of Arts and Science

*Alvin Patris, B.A. (Eastman School of Music) Director of the Gospel Choir*

Additional faculty members, Eastman School of Music

The music program uses six to eight teaching assistants from the Eastman School of Music as lecturers or musicianship instructors.

Students from all disciplines may participate in the pleasures and rigor of musical study and performance to acquire a deeper understanding of the many ways music (and related arts) reflects values of various cultures, influences lives, and enriches human existence. The music program of the College of Arts and Science offers courses of study leading to the B.A. degree with a concentration in music and a minor in music. A wide variety of nontechnical courses address nonconcentrators who wish to study music on an introductory, interdisciplinary, or aesthetic basis. Degree programs, course offerings, and performance opportunities in music are diverse and invite choice and flexibility. Courses offered at the Eastman School of Music, normally open to any student presenting the proper prerequisites, augment the range and depth of musical experiences and courses

*Part-time
**Has applied for one or two semesters of leave in 1993-94

**The Official Bulletin: Graduate Studies**
available to students in the College of Arts and Science. (For information concerning the bachelor of music degree and courses offered at the Eastman School, consult the School’s official bulletin. Credit for ESM courses will be awarded according to the system used at the Eastman School.)

MUSICAL ENSEMBLES AT THE RIVER CAMPUS
Currently more than 300 students participate in nine musical ensembles that present approximately 40 concerts each year. Instrumental organizations include the University Symphony Orchestra, the Symphonic Wind Ensemble, the University Chamber Orchestra, the Jazz Ensemble, and the Chamber Music program. Choral activities comprise the University Glee Club, the University Chamber Singers, the Gospel Choir, and two a cappella singing groups—the Yellowjackets (men) and Vocal Point (women).

In addition, there are a number of special musical events, including musical theater productions on a regular basis, and off-campus concerts and tours.

Students in any college of the University are eligible to audition for membership in musical ensembles on the River Campus. Undergraduate students may elect to enroll in musical ensembles for credit; grades are awarded as CR (credit) and NCR (noncredit). Each ensemble carries credit, but a student may earn only 1 credit per semester for participation in musical groups. Music ensembles may be repeated for credit; a maximum of 8 credit hours for music concentrators and 4 credit hours for all other students may be counted as electives toward the bachelor’s degree.

PRIVATE INSTRUMENTAL AND VOCAL INSTRUCTION
Credit Lessons
Each year approximately 200 River Campus students, including music concentrators and nonconcentrators, take private instrumental or vocal lessons for credit at the Eastman School. Anyone at an intermediate level of proficiency on an instrument or in voice is encouraged to apply to take credit lessons. Prior to registering for lessons for the first time, students must audition during the first three days of the semester. Applications for applied music instruction are available from the secretary of the music program.

Most students meet with their instructors once a week for 30 minutes, and receive 2 credits for lessons. Students who qualify for one-hour lessons may be awarded additional credit. The addition of private lessons to a normal 16-credit-hour semester is not considered an overload, and there is no fee or additional tuition charge. No more than 8 credit hours of applied instruction for nonmusic concentrators and 16 credit hours for music concentrators may be counted toward the B.A. degree.

Noncredit Lessons
A limited number of students may take lessons without credit by enrolling directly with the Community Education Division of the Eastman School. The cost of this instruction is not included in regular college tuition; students are billed directly by the Eastman School. College credit will not be awarded for these lessons nor will such lessons appear on the student’s permanent record at the University. However, the Community Education Division awards grades for all study, and a transcript of such study is available through the Community Education Division Office at the Eastman School of Music.

Practice Facilities
Practice facilities in the Spurrier Building and Lower Strong on the River Campus are open to members of the University community. Keys are available at the Information Desk in Wilson Commons.

THE B.A. WITH A CONCENTRATION IN MUSIC
The College of Arts and Science, in cooperation with the Eastman School of Music, offers the bachelor of arts degree with a concentration in music. This degree program in music addresses students who can meet both the intellectual and musical challenges of a rigorous program that emphasizes the broad experience of a liberally educated person. The concentration comprises a balanced program of academic courses, private instruction, and ensemble experience that fosters understanding of musical languages, historical developments, and compositional styles while encouraging excellence in performance. The core curriculum in music theory and history provides the common foundation for advanced study of specialized subfields in music (musicology, theory, conducting, management, performance, composition, music education, etc.) both in the final years of undergraduate education and at the graduate or professional level.

Although the concentration in music is a demanding one, students often also explore, beyond the introductory level, one or more nonmusic disciplines. Some students pursue a double major. Such flexibility allows, for example, students to combine prelaw or premedicine preparation with a concentration or minor in music.

Students who concentrate in music in the B.A. program at the University of Rochester usually demonstrate significant prior musical experience. Applicants to the College of Arts and Science who are considering a concentration in music are encouraged to audition (in person or by tape) as part of the admission process so that musical achievement can be considered in the admission decision and the student can be advised of placement in private instruction at the Eastman School. Students are admitted to the music concentration by the music faculty after a review, usually in the sophomore year, of their academic records and musical progress. Music concentrators are encouraged to satisfy their foreign language requirement in either German or French. Students must have satisfied the piano proficiency requirement or be enrolled in an appropriate piano class before they can be admitted to the concentration.

REQUIREMENTS FOR THE MUSIC CONCENTRATION
A concentration in music (52 credits) will include these minimum requirements:
2. Music history (16 credits): MUR 221, 222, 223, 224

3. Ensemble (4 credits) at least two of which must be in a River Campus ensemble. A maximum of 8 credits may be counted toward the B.A. degree.

4. Private instruction (8 credits—minimum four semesters). Students receiving an audition rating equal to or higher than performance majors in the B.M. program at the Eastman School may be assigned a primary studio instructor at the discretion of the Associate Director for Academic Affairs at Eastman. All other students will be assigned secondary instructors.

5. Piano proficiency (0-8 credits). Students must demonstrate keyboard facility prior to graduation by successfully completing PCL 104 or being exempted on the basis of comparable proficiency. Auditions are held during the first week of classes in the fall term.

6. Music electives (8 credits). May be chosen from any MUR or ESM course numbered 200 or higher, except ESM Music History 421–426. No ensemble or applied music (private instruction) credits may be included. (See the Official Bulletin: Eastman School of Music for its course offerings and credit hours.)

In accordance with University policy, no more than 80 credit hours may be taken in music. Although the requirements for the concentration in music can be met in three years, any student who is considering a music concentration is urged to begin the music theory sequence in the fall semester of the freshman year. Students with limited background in music who do not qualify for Theory 1 should enroll in MUR 110, Introduction to Music Theory, during the freshman year. All prospective concentrators are urged to enroll in MUR 134 prior to MUR 221.

THE MINOR IN MUSIC

Seven courses (28 credit hours) are required, including:

• MUR 111, 112; 134
• 4 credits in ensemble or applied music
• 12 credit hours in music courses numbered MUR 120 or ESM 200 or above, excluding ensembles and applied music

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

100. Experiencing Music. This course explores all aspects of music, from elementary technical concept (rhythm, melody, texture, basic forms) to the factors that shape musical performance and composition, such as the rehearsal process, architectural acoustics, and the economics and management of musical institutions (like symphony orchestras, opera companies, and the recording industry). The course includes in-class performances and discussions with performers, as well as some concert attendance. In addition to the lectures and discussion sessions, there are listening sessions in which emphasis is placed on the development of aural skills.

101. Elements of Music. A nonthreatening theory course for the student with limited or no previous musical experience. Notation, intervals, chords, and other basic concepts of tonal harmony, with application to the study of a wide range of styles including popular idioms. Little emphasis on ear training and keyboard work. No prerequisites. (Fall and Spring)

102. Masterpieces of Western Music. A course for the nonconcentrator, designed to increase the understanding and enjoyment of music for performers and listeners. The course focuses on listening skills and a brief historical survey of musical styles without reliance upon technical language or the ability to read music. No prerequisites. (Fall and Spring)

105. Music of African-Americans I: Selected Topics through the Harlem Renaissance. This course considers Afro-Christian musical beginnings including the Black Church, forms of worship, early musical practices, the Spiritual, evolution of Gospel, antebellum musical activities including song types, character of the folk music with respect to poetic and musical form, language, and themes; blues, including its origins, its evolution through the 1940s; the Harlem Renaissance and the important literary contributions of black writers such as Langston Hughes, Countee Cullen, Claude McKay, Georgia Douglas Johnson, and others.

106. Music of African-Americans II: Selected Topics from the Harlem Renaissance through the Present. This course includes classical musical forms from the late nineteenth century to the middle twentieth century; music of the theater from minstrelsy to Broadway; precursors of jazz, the syncopated dance orchestra, and brass bands; early jazz to be-bop. Attention is devoted also to important writers of the black literary avant-garde of the 1960s and 1970s including Amin Baraka, Larry Neal, Hoyt Fuller, and others, especially with respect to their thinking about the music of African-Americans.

110. Introduction to Music Theory. Basic concepts of music theory, addressing students with prior musical experience but insufficient skills to qualify for MUR 111. Scales, keys, intervals, chords, basic part-writing, and other fundamental aspects of musical structure. Some ear training and aural skills. Prerequisite: Ability to read music, preferably in both treble and bass clefs.
111. **Theory and Musicianship I.** The first course in a four-term sequence in music theory and musicianship required for the concentration. The vocabulary and syntax of tonal harmony and counterpoint, with musicianship lab in sight-singing, dictation, keyboard harmony, and other skills. Prerequisite: Knowledge of treble and bass clefs, scales, keys, triads, intervals, as demonstrated by a qualifying score on placement test administered during orientation periods. (Fall)

112. **Theory and Musicianship II.** Continuation. Prerequisite: MUR 111. (Spring)

121. **World Music Traditions.** This course explores some of the world's major musical traditions, including those of India, Indonesia, China, Eastern Europe, sub-Saharan Africa, and the Americas. Students become familiar with the social, economic, and religious systems surrounding musical practices, as well as with the building blocks of the world's music from various pitch and improvisational systems to those of time, form, and texture. No prerequisites.

122. **History of Jazz.** A survey of the history of jazz from pre-1900 origins to the present. No prerequisites. (Spring)

123. **History of Afro-American Music.** A social and historical survey of the music made primarily by and for blacks in America. Traces the development from the origins in Africa to its present state in American culture. No prerequisites. (Spring)

124. **Gender and Music.** Have you ever watched a classical music concert? A night-club jazz performance? an MTV video? Do you play a musical instrument or sing in a choir? Have you ever wondered if, or how, your gender affected your ideas about and experiences with music? This course explores the role of gender in various world musical systems through recordings, videos, and personal experiences.

125. **American Musical Theater.** A historical survey of the repertoire of American musical theater within its social, dramatic, and musical contexts from 1900 to the present. (Fall)

126. **Music and Ritual.** Many of the world's people regard music as a primary form of communication with the spirit world. Used in a variety of contexts, music can cure the sick, initiate children into the adult world, or move one into a state of trance or ecstasy. This course examines the role of music in a variety of rituals from the North Australian Wild Onion Dance to the ritual of the half-time show.

134. **Musical Style and Genre.** A one-semester intensive survey of musical styles and genres, intended for those with considerable previous musical experience. Required for the minor in music, recommended for concentrators. Prerequisite: MUR 101, 110, or 111 or permission of instructor. (Spring)

135. **Musical Theater in Production.** Full-scale production of musical theater. Depending on the level of involvement and responsibilities, the course may be taken for 2 or 4 credits, subject to approval of the instructor. Cast members who take the course for credit will be expected to attend dance classes, acting workshops, and coaching sessions. Technical and management participants will work under supervision on various backstage aspects of production. (Spring)

141-9. **Topics in Music History.** Specific subjects will be announced in the Schedule of Courses. Previous topics have included Beethoven's symphonies, Mozart's operas, Renaissance Court Music, Music and the Visual Arts, Bach and Handel, Music and Film, Opera, Intended for the nonconcentrator. Prerequisite: MUR 101, 102, or 111.

151. **Symphonic Wind Ensemble.**

152. **Jazz Ensemble.**

153. **University Symphony Orchestra.**

154. **University Chamber Orchestra.**

155. **Chamber Ensembles.**

156. **University Glee Club.**

158. **University Chamber Singers.**

159. **Gospel Choir.**

211. **Theory and Musicianship III.** Continuation. Prerequisite: MUR 112. (Fall)

212. **Theory and Musicianship IV.** Continuation. Prerequisite: MUR 211. (Spring)

221. **Music History I.** A historical survey of music from the Middle Ages to the Renaissance, with an introduction to listening skills, methodology, music reference tools, and writing about music. Fulfills upper-level writing requirement. Prerequisite: MUR 112 (Fall)

222. **Music History II.** A historical survey of music from ca. 1500 to ca. 1770, with an emphasis on stylistic analysis and cultural contexts. Prerequisites: MUR 211, 221. (Spring)

223. **Music History III.** A historical survey of music from ca. 1770 to ca. 1880, with an emphasis on structural analysis, compositional procedure, and relationships to literature and visual art. Prerequisite: MUR 212, 222. (Fall)

224. **Musical History IV.** A historical survey of music from 1880 to the present. Prerequisite: MUR 212, 223, (Spring)

233. **Musical Theater Workshop.** Intensive practical experience with scene-and-song work from the repertory of popular musical theater genres. Prerequisite: one year of voice instruction, ENG 129, or permission of instructor. (Fall)

241-9. **Topics in Music History.** Intensive study of limited repertoire with emphasis on analysis and critical writing by the student. Specific subjects to be announced. Prerequisites: MUR 212 or 134.

251. **Senior Seminar.** Required of all students preparing senior projects in music. (Spring)

252. **Independent Study in Music.** (Fall and Spring)
NAVAL SCIENCE

Ralph K. Martin, Captain, USN, M.A. (Wisconsin) Professor of Naval Science and Chair of the Department
R. Griffin, Commander, USN, M.S. (Naval Postgraduate School) Associate Professor of Naval Science
Christopher P. Ankram, Lieutenant, USN, B.S. (Marquette) Assistant Professor of Naval Science
Lance F. Hagenbuch, Lieutenant, USN, B.S. (RPI) Assistant Professor of Naval Science
Mark E. Luoma, Lieutenant, USN, B.S. (Massachusetts) Assistant Professor of Naval Science
Theodore D. Schultz, Lieutenant, USN, B.A. (Rochester) Assistant Professor of Naval Science

The Department of Naval Science does not use teaching assistants in its instructional program.

Naval science studies are designed to prepare students seeking commissions in the U.S. Navy or U.S. Marine Corps through the NROTC Program. The University has had an NROTC unit on campus since 1946. The NROTC Program is open to both male and female students. Any student may enroll in courses offered by the Department of Naval Science.

Students participate in the NROTC Program in one of three options:

1. NROTC SCHOLARSHIP PROGRAM students are selected by national competition. Applications may be obtained from the Department of Naval Science and must be mailed by early November for enrollment in the following fall semester. Students are subsidized by the Navy for tuition, fees, textbooks, and uniforms, and they receive a subsistence allowance of $100 per month during the academic year. Scholarship students may withdraw from the program at their own request without obligation at any time prior to the beginning of the sophomore year. Thereafter, the student is obligated to accept a commission as Ensign, USNR, or Second Lieutenant, USMCR, upon graduation and to serve on active duty for a minimum of four years.

2. NROTC COLLEGE PROGRAM is available to all freshmen and sophomores and is specifically designed to provide an opportunity for students to earn a commission. Students are welcome to apply for the program by contacting any member of the Department of Naval Science for details. College Program students receive uniforms and a subsistence allowance of $100 per month during the junior and senior years. College Program students are eligible to enter the national scholarship competition and, if successful, become Scholarship students. College Program students incur a service obligation upon beginning their junior year. They must agree to accept a commission as Ensign, USNR, or Second Lieutenant, USMCR, upon graduation and to serve thereafter on active duty for three years.

3. TWO-YEAR COLLEGE PROGRAM students may apply for the program by submitting their applications to the Professor of Naval Science. Sophomores who have two years of study remaining (including two summers) prior to receiving a baccalaureate or higher degree are eligible to apply. Students selected for the Two-Year Program attend the Naval Science Institute for about six weeks during July and August at the Naval Education and Training Center, Newport, Rhode Island. Tuition, room, board, travel expenses, and modest subsistence are provided. The student is then eligible to join the NROTC College Program in the fall, assuming the same obligations as other College Program students.

ELIGIBILITY FOR NROTC PROGRAMS

In general, students must be U.S. citizens between 17 and 21 years of age and be physically qualified in accordance with standards prescribed for Navy midshipmen. More detailed information can be obtained from the Department of Naval Science office.

SUMMER TRAINING CRUISES

Students in the NROTC Program participate in summer cruises of approximately six weeks' duration as part of their training to become officers in the Navy or Marine Corps. Cruises are aboard naval ships, submarines, aircraft squadrons, and shore bases throughout the world. Four-year Scholarship students attend three such summer cruises. College Program students attend one such cruise, between the junior and senior years. Two-year Scholarship students attend one cruise. While on cruise, NROTC students receive room, board, travel expenses, and compensation equivalent to one-half ensign's pay.
NAVAL SCIENCE STUDENTS
Any student in the University may take naval science courses. Credits for courses taken in the Department of Naval Science are determined by the college in which the student is pursuing his or her concentration. Students who are thinking about applying to an NROTC program are encouraged to enroll in a naval science course.

NROTC COURSE REQUIREMENTS
The following is the recommended sequence of naval science courses for midshipmen. Deviations from the recommended sequence are permitted; however, they must be approved by the Professor of Naval Science.

First Year
- NS 93. Introduction to Naval Science
- NS 250. Sea Power and Maritime Affairs

Second Year
- PSY 264. Psychology in Business and Industry
- NS 94. Ship Systems I

Third Year
- NS 221. Navigation I
- NS 98. Navigation II

Fourth Year
- NS 249. Ship Systems II
- NS 265. Leadership and Management I

Various other courses, contained in a core curriculum, are prescribed for midshipmen depending upon their category/service. Details may be obtained from the Department of Naval Science.

OTHER ACADEMIC REQUIREMENTS
Midshipmen are encouraged to pursue courses of study leading to degrees in engineering, physics, mathematics, and chemistry, but may also follow any program which leads to a baccalaureate degree. Marine Option midshipmen will take Amphibious Operations (NS 99), Evolution of Strategic Concepts (NS 251), and two electives, approved by the Professor of Naval Science, during their junior and senior years, instead of the sequence listed previously.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

93. Introduction to Naval Science. No credit. Introduction to the Navy, including customs, traditions, seamanship, officer responsibilities, and naval careers. (Fall)

94. Ships Systems I. No credit. Introduction to shipboard engineering, including other topics to prepare midshipmen for their first summer training cruise. (Spring)

98. Navigation II. No credit. The rules designed to prevent collisions at sea and techniques for determining the relative motion between ships. (Spring)

99. Amphibious Operations. No credit. The organization, techniques, and strategies employed by the U.S. Navy and Marine Corps in the conduct of an amphibious operation. (Fall)

221. Navigation I. Credit—4 hours. Theory and techniques of the art of navigation, including dead reckoning, piloting, and electronic and celestial navigation. (Fall)

249. Ships Systems II. Credit—4 hours. Analysis of ship systems and working environments; system selection, system control, computational procedures, data transmission and control. (Fall)

250. Sea Power and Maritime Affairs. Credit—4 hours. A survey of all aspects of maritime affairs and the effects of sea power on national development. A discussion of historical events. (Spring)

251. Evolution of Strategic Concepts. Credit—4 hours. A study of the development of strategic concepts by various world powers, with emphasis on naval strategies. (Fall)

265. Leadership/Management II. Addresses many issues facing managers and leaders in the workplace. Topics include ethics, counseling, evaluating performance, decision making, and equal employment opportunity. The information presented is practical in nature and case studies are used to provide applications.

PHILOSOPHY

Richard Feldman, Ph.D. (Massachusetts)  Associate Professor of Philosophy
Robert Lawrence Holmes, Ph.D. (Michigan)  Professor of Philosophy
Henry E. Kyburg, Jr., Ph.D. (Columbia)  Burbank Professor of Philosophy and Professor of Computer Science
Dennis O’Brien, Ph.D. (Chicago)  Professor of Philosophy
Earl Conee, Ph.D. (Massachusetts)  Associate Professor of Philosophy
Ralf Meerbote, Ph.D. (Harvard)  Associate Professor of Philosophy
Deborah Modrak, Ph.D. (Chicago)  Associate Professor of Philosophy
David Braun, Ph.D. (California, Los Angeles)  Assistant Professor of Philosophy
Randall Cuten, Ph.D. (Oxford)  Assistant Professor of Education and of Philosophy
Theodore Sider, Ph.D. (Massachusetts)  Assistant Professor of Philosophy
Lewis White Beck, Ph.D. (Duke)  Burbank Professor Emeritus of Moral and Intellectual Philosophy
Rolf A. Eberle, Ph.D. (California, Los Angeles)  Professor Emeritus of Philosophy
Harmon R. Holcomb, B.D. (Colgate Rochester Divinity School)  Professor Emeritus of Philosophy and of Religion
Alfred Harrison Jones, Ph.D. (Cornell)  Professor Emeritus of Philosophy
Colin Murray Turbayne, Ph.D. (Pennsylvania)  Professor Emeritus of Philosophy

The Department of Philosophy offers programs leading to the B.A., the M.A., and the Ph.D. degrees. The philosophers who are members of the Department of Philosophy have a variety of specialties in philosophy and represent diverse philosophical perspectives. Philosophical issues addressed in undergraduate courses include both traditional topics from areas such as epistemology, ethics, metaphysics, political philosophy and the philosophy of science; and also the most recent contemporary concerns. The techniques brought to bear on these issues are analytical, formal, and historical. The undergraduate program stresses

*Has applied for one or two semesters of leave in 1993-94.
Western philosophy, ancient and modern, and gives particular emphasis to recent and contemporary Anglo-American philosophy. The Department's course offerings provide excellent foundations for graduate work in law and cognitive science, as well as in philosophy itself. A concentration in philosophy is an especially valuable asset when combined with a concentration in political science, economics, or natural sciences such as biology, chemistry, geology, physics, and psychology.

Undergraduates who wish to take advantage of the University's graduate offerings in philosophy may, with permission of the instructor and approval of the undergraduate advisor, take a graduate seminar (see Official Bulletin: Graduate Studies).

In addition to a general concentration in philosophy, the Department offers three special programs. One, the philosophy concentration with emphasis on law and ethics, is designed primarily for prelaw students and others who are interested in an extensive investigation of the nature of law, value, and social justice. The second special concentration emphasizes history, and is designed for students with both scholarly and philosophical interests in the history of philosophy. The third special concentration emphasizes logic and the philosophy of science. It is designed primarily for students interested in one or more of the sciences who wish to pursue in depth the study of logic and the philosophy of science.

The Department of Philosophy offers an honors program for exceptional students who show promise of being able to do individual research in philosophy and to complete an honors thesis. Students who wish to apply for the honors program should consult with the Director of the Philosophy Department, and must submit a thesis by April 1, and defend the thesis orally by the final day of classes. After a student has completed an Honors Thesis, the thesis is reviewed by a three-person faculty committee, including the Director of the Honors Program, the student's advisor, and one other faculty member. If the committee approves the thesis, an oral exam will be conducted.

The bachelor's degree with distinction is offered on recommendation of the Department and is based primarily on the grade-point average in philosophy. Performance in undergraduate seminars and in independent study is sometimes considered.

Philosophy is relevant to every program and concentration in the University. The basic problems it addresses are of perennial significance. Below are listed groups of courses that might be of particular relevance to students concentrating in other disciplines:

**Anthropology**
- PHL 102, 105, 201, 202, 247, 252
- Biology, Chemistry, Geology, Microbiology, Physics and Astronomy
  - PHL 202, 210, 252
- Computer Science, Mathematics
  - PHL 210, 211, 214, 218, 252
- Economics
  - PHL 102, 210, 220, 223, 252
- English, Art and Art History, Foreign Languages, Literatures, and Linguistics
  - PHL 141, 201, 202, 203, 211, 240, 247
- History
  - PHL 201 through 209
- Naval Science
  - PHL 102, 108, 210, 223, 252
- Political Science
  - PHL 102, 203, 210, 220, 223, 252
- Psychology
  - PHL 211, 244, 247, 254
- Religion
  - PHL 101, 111, 201, 202, 242, 246
- Sociology
  - PHL 102, 103, 202, 203, 223, 252
- Statistics
  - PHL 210, 217, 252.

**Requirements for Concentration in Philosophy**

A total of 10 courses:
- Five or more additional courses in philosophy. These courses must include
  - (a) one course in ethics from among PHL 102, 103, 220, 225, and 230,
  - (b) one course from among PHL 214, 217, 218, 242, 243, 244, 247, 248, 252, 254, and 258;
  - (c) one 200-level course (other than PHL 201, 202, and 210) of the student's choice.
- Two advanced courses, approved by the Department advisor, in an allied field.

**Philosophy Concentration with Emphasis on Law and Ethics**

A total of 11 courses:
- One course in reasoning from among PHL 105, 106, 211, 217, 243.
- One course from among PHL 214, 217, 218, 242, 243, 244, 247, 248, 252, 254, 258.
- Four courses on ethics or law from among PHL 102, 103, 220, 223, 225, 226, 230.
- Two advanced courses in an allied field, subject to the approval of the undergraduate advisor.

**Philosophy Concentration with Emphasis on History**

A total of 11 courses:
- One course in ethics from among PHL 102, 103, 220, 225, 230.
- One course from among PHL 214, 217, 218, 242, 243, 244, 247, 248, 252, 254, 258.
- Four courses in the history of philosophy from among PHL 245, 246, 261, 266, 267, 315, 319, 320, 323, 370.
- Two advanced courses in an allied field, subject to the approval of the undergraduate advisor.

**Philosophy Concentration with Emphasis on Logic and the Philosophy of Science**

A total of 10 courses:
- One course in ethics from among PHL 102, 103, 220, 230.
- Four courses in logic or the philosophy of science from among PHL 105, 106, 211, 214, 215, 216, 217, 218, 243, 252, 253, 254, 352. The student must take either 215 or 252.
- Two advanced courses in an allied field, subject to the approval of the undergraduate advisor.

Ordinarily, a student who concentrates in both philosophy and some other discipline will take the advanced courses listed above that are recommended to students in that other discipline.

Qualified concentrators in philosophy may be approved by the Department for the Study Abroad program. Students may minor in philosophy by following one of the four plans described below. There is a general minor in philosophy and specialized minors in philosophy of science, ethics, and history of philosophy. There is considerable flexibility in devising philosophy minors. Students formulate their programs in close consultation with the undergraduate advisor.
MINORS IN PHILOSOPHY
Each minor requires five courses chosen in consultation with the undergraduate advisor.

Plan A
PHILOSOPHY OF SCIENCE

Plan B
ETHICS
PHL 102 and four other courses in ethics and related areas. Courses include 103, 220, 223, 225, 226, 228, 230, 391.

Plan C
HISTORY OF PHILOSOPHY
PHL 201 and 202 and three other courses in the history of philosophy. Courses include 245, 246, 261, 266, 267, 315, 319, 320, 323, 370.

Plan D
PHILOSOPHY
Students may devise in consultation with the undergraduate advisor their own five-course minor in philosophy.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

INTRODUCTORY COURSES
101. Introduction to Philosophy. A study of fundamental philosophical problems and approaches to their solution. (Fall, Spring)
102. Ethics. A critical examination of leading theories of right and wrong, and good and evil. (Spring)
103. Contemporary Moral Problems. The application of ethical theory to moral problems, such as punishment, abortion, and racism. (Fall)
105. Reason and Argument. A study of reason and argument on both scientific and non-scientific topics. How to evaluate reasoning as it is found in editorials, speeches, and essays. How to understand and evaluate the reasoning found in reports on scientific research. (Fall)
106. Rational Decisions. An introduction to formal decision theory with special emphasis on its philosophical foundations.
108. Philosophy of War. An examination of the concepts of war, legal and moral aspects of just war theory, pacifism, and the problem of war and moral responsibility.
111. Philosophy of Religion. Same as REL 111. (Fall)
112. Rationality and Religious Belief. Same as REL 112.
141. Aesthetics. Critical examination of some of the major problems in aesthetics and consideration of the historical routes along which they have evolved. Same as AH 269
171. Philosophical Foundations of Feminism. The investigation of some of the philosophical issues raised by contemporary feminism, such as questions about justice, human nature, and human freedom. Same as WST 295 (Spring)

HISTORICAL COURSES
201. History of Ancient Philosophy. Lecture survey of the development of Western philosophy from the prephilosophical beginnings through Aristotle. (Fall)
202. History of Modern Philosophy. A study of important philosophers from the seventeenth to the eighteenth century, and of their position in the cultural history of the West. (Spring)
266. Rationalism. A study of the three great philosophical figures of the rationalist period, namely, Descartes, Leibniz, and Spinoza, with emphasis on the last. Topics include the nature of substance, of space and time, and of knowledge and mind. Prerequisite: PHL 202.

LOGIC AND RELATED COURSES
210. Introductory Logic. Precise methods for formalizing arguments, demonstrating their validity, and proving theorems in first-order symbolic logic. Same as COG 210. (Fall, Spring)
211. Logic and Language. Logical analysis, consequences, and semantics in natural languages: presupposition, possibility, tenses, ambiguity, vagueness, etc.
214. Logical Methods in Philosophy. Philosophical logic: modal, tense, many-valued logic, logical linguistics, mereology, etc. Prerequisite: PHL 210. (Fall)
215. Intermediate Logic. Formal axiomatic treatment of alternative systems of theory or higher order logic. Prerequisite: PHL 210 or permission of instructor.
216. Mathematical Logic. Same as MTH 216, CSC 216. Prerequisite: PHL 210 or permission of the instructor.
217. Uncertain Inference. The exploration of various measures of uncertainty proposed in both philosophy and computer science. Prerequisite: PHL 210 or equivalent. Same as CSC 217.
218. The Philosophy of Mathematics. A study of the nature of mathematics from a philosophical point of view. Prerequisite: PHL 210 or permission of the instructor.

ETHICS AND RELATED COURSES
220. Recent Ethical Theory. An examination of the main twentieth-century ethical and metaethical theories. Readings from Moore, Ross, Stevenson, Hare, et al. Prerequisite: PHL 102 or permission of the instructor.
223. Social and Political Philosophy. An inquiry into the nature of human society, role of the state, and relation of moral to legal obligation. Prerequisite: PHL 102 or permission of the instructor.
225. Ethical Decisions in Medicine. Same as REL 223. (Spring)
226. Philosophy of Law. The nature of law and legal practice in relation to ethics. Prerequisite: one previous course in philosophy. (Fall)
230. History of Ethics. An examination of the major writers on ethics in Western thought, including Plato, Aristotle, Aurelius, Augustine, Hume, Kant, Mill, and Nietzsche. Prerequisite: one previous course in philosophy.

TRADITIONAL PHILOSOPHICAL DISCIPLINES
243. Theory of Knowledge. A study of the nature and extent of human knowledge. What is knowledge? Can skepticism be refuted? Under what conditions are beliefs justified or rational? Can anyone know what is right and wrong? Prerequisite: one previous course in philosophy. (Fall)
244. Philosophy of Mind. A discussion of problems connected with the nature of mind, e.g., the mind/body problem and the problem of personal identity. Prerequisite: one previous course in philosophy.
245. Selected Topics in Ancient Philosophy. Prerequisite: PHL 201 or permission of instructor. (Fall)
246. Augustine, Anselm, and Aquinas. Same as REL 224.
247. Philosophy of Language. A study of philosophical questions about language and the general nature of language. Prerequisite: one previous course in philosophy. (Spring)
248. Free Will. An examination of philosophical problems concerning free will, moral responsibility, and causal determinism. Prerequisite: one previous course in philosophy.

PHILOSOPHY OF SCIENCE
252. Philosophy of Science. An examination of scientific theories, and the nature of causal and statistical explanation. Prerequisite: PHL 210 or permission of instructor. (Spring)
254. Philosophy of Psychology. A study of philosophical topics relating to psychology. What is a mind and can it be scientifically studied? Behaviorism, Justifying psychological theories. Freedom and determinism. The ethics of psychological research. Prerequisite: one previous course in philosophy or permission of instructor. Same as COG 254. (Spring)

258. Science and Reason. A relatively formal assessment of the role of both inductive and deductive argument in science. Primarily for philosophy majors and majors in the sciences. Prerequisite: PHL 210 or permission of the instructor.


SEMINARS

308. Morality and War. An examination of the question whether war can be morally justified, with special attention to the just war theory, the killing of innocents, and nuclear deterrence. Prerequisite: one previous course in philosophy. (Spring)

315. Plato's Republic. Credit—2 hours. An in-depth examination of the structure of the overall argument in Plato's Republic with special attention to Plato's views on morality and knowledge. (One-half term course)

323. Topics in Nineteenth-Century German Philosophy. Topics in post-Kantian German idealism. Prerequisites include at least one of the following: PHL 266, 267, 530, 531, or consent of instructor.

342. Metaphysics. A close examination of one or more topics from recent work in metaphysics, such as identity, essential properties, universals, possible worlds, and free will.

360. Selected Topics in the Philosophy of Religion. An examination of recent work in the philosophy of religion. Prerequisite: one previous course in philosophy.

391. Independent Study in Philosophy. The reading of philosophical literature under guidance, for seniors majoring in philosophy. (Fall, Spring)

PHYSICS AND ASTRONOMY

Arie Bodek, Ph.D. (M.I.T.)
Professor of Physics
Douglas Cline, Ph.D. (Manchester)
Professor of Physics and Director of the Nuclear Structure Research Laboratory
David H. Douglass, Jr., Ph.D. (M.I.T.)
Professor of Physics
Joseph H. Eberly, Ph.D. (Stanford)
Professor of Physics
Thomas Fetbel, Ph.D. (Yale)
Professor of Physics
Carl Richard Hagen, Ph.D. (M.I.T.)
Professor of Physics
Robert S. Knox, Ph.D. (Princeton)
Professor of Physics
Daniel S. Koltun, Ph.D. (Rochester)
Professor of Physics
Frederick Lokborskic, Ph.D. (Edg. Tech. Hochschule Zutich)
Professor of Physics
Leonard Mandel, Ph.D. (London)
Professor of Physics
Adrian C. Melissinos, Ph.D. (M.I.T.)
Professor of Physics
Susumu Okubo, Ph.D. (Rochester)
Professor of Physics
Judith L. Pipher, Ph.D. (Cornell)
Professor of Astronomy and Director of the C. E. Kenneth Mees Observatory
Albert Simon, Ph.D. (Rochester)
Professor of Mechanical Engineering and of Physics
Paul Slattery, Ph.D. (Yale)
Professor of Physics and Chair of the Department
Carlos R. Strowl, Jr., Ph.D. (Washington)
Professor of Optics and of Physics
John H. Thomas, Ph.D. (Purdue)
Professor of Mechanical and Aerospace Sciences and of Astronomy
Edward H. Thordike, Ph.D. (Harvard)
Professor of Physics
Hugh M. Van Horn, Ph.D. (Cornell)
Professor of Physics and of Astronomy
Emil Wolf, Ph.D. (Bristol), D.Sc. (Edinburgh)
Wilson Professor of Optical Physics
Ashok Das, Ph.D. (UNY, Stony Brook)
Associate Professor of Physics
William J. Forrest, Ph.D. (California, San Diego)
Associate Professor of Astronomy
Jonathan Shapir, Ph.D. (Tel Aviv)
Associate Professor of Physics
Stephen L. Teitel, Ph.D. (Cornell)
Associate Professor of Physics
Nicholas P. Bigelow, Ph.D. (Cornell)
Assistant Professor of Physics
Thomas H. Foster, Ph.D. (Rochester)
Assistant Professor of Radiology and of Physics
Yongli Gao, Ph.D. (Purdue)
Assistant Professor of Physics

Lynne H. Orr, Ph.D. (Chicago)
Assistant Professor of Physics
Sarada G. Rajeev, Ph.D. (Syracuse)
Assistant Professor of Physics
Paul L. Tipton, Ph.D. (Rochester)
Assistant Professor of Physics
Mark Wardle, Ph.D. (Princeton)
Assistant Professor of Astronomy
*Dan M. Watson, Ph.D. (California, Berkeley) Assistant Professor of Physics and Astronomy
Frank Wolfs, Ph.D. (Chicago) Assistant Professor of Physics
Chang-Hong Yu, Ph.D. (Copenhagen)
Assistant Professor of Physics
Michael Rubenstein, Ph.D. (Harvard)
Adjunct Associate Professor of Physics
Ralph H. Colby, Ph.D. (Northwestern)
Adjunct Assistant Professor of Physics
David Meisel, Ph.D. (Ohio State)
Assistant Director, C. E. Kenneth Mees Observatory
Theodore Caster, Ph.D. (Illinois) Professor Emeritus of Physics and Senior Faculty Associate
J. Bruce French, Ph.D. (M.I.T.) Andrew Carnegie Professor Emeritus of Physics
Harry W. Fullbright, Ph.D. (Washington) Professor Emeritus of Physics
Harry E. Gove, Ph.D. (M.I.T.) Professor Emeritus of Physics
H. Lawrence Helfer, Ph.D. (Chicago) Professor Emeritus of Astronomy and Senior Faculty Associate
John R. Huijen, Ph.D. (Illinois) Tracy H. Harris Professor Emeritus of Chemistry and of Physics
Edward H. Jacobsen, Ph.D. (M.I.T.) Professor Emeritus of Physics and Senior Faculty Associate
Malcolm P. Svedoff, Ph.D. (Princeton) Professor Emeritus of Astronomy and Senior Faculty Associate
Stewart L. Sharpless, Ph.D. (Chicago) Professor Emeritus of Astronomy and Senior Faculty Associate
Robert L. Sproull, Ph.D. (Cornell) Professor Emeritus of Physics

Approximately 25 graduate teaching fellows and several carefully selected undergraduates assist the faculty in the presentation of the teaching program.

The Department of Physics and Astronomy provides a spectrum of opportunities for undergraduates ranging from introductory courses for the nonscientist to a minor in physics or astronomy and complete degree programs leading to the B.A. and B.S. in physics or in physics and astronomy. Its programs at the master's and doctoral levels provide numerous advanced courses to the undergraduate seeking an in-depth education.

*Has applied for one or two semesters of leave in 1993-94
In accordance with general College policy, students are not formally accepted as concentrators until the end of their sophomore year. However, freshmen or sophomores wishing to major in physics or in physics and astronomy should make this known at the Department's Office of Undergraduate Studies, whereupon they will be assigned a departmental advisor.

The Department awards several prizes in recognition of special achievement. The Honors Physics Prize is presented annually to the student with the best record in PHY 142 and 143. The Stoddard Prize is awarded for the best senior thesis. The Fulbright Prize is awarded for the best performance in Advanced Laboratory. The John F. Flagg Award is given annually to the graduating senior who has compiled the best academic record during his or her undergraduate program.

A fuller description of the requirements for these prizes may be obtained at the Office of Undergraduate Studies, 210 Bausch & Lomb Hall.

GENERAL COURSE INFORMATION
Of particular interest to students not concentrating in the natural sciences are PHY 100, AST 102, and AST 104, each a broad survey of selected topics in their field, requiring no special background. Students with a deep interest in science and music will find PHY 110 ARTS AND SCIENCE

in tensive and provides strong preparation in school science and mathematics, as does AST 102, and AST 104, each a broad survey of selected topics in their field, requiring no special background. Students with a deep interest in science and music will find PHY 110 ARTS AND SCIENCE

of the sophomore year and are subject to departmental approval.

B.A. PROGRAM (PHYSICS)
Requirements beyond the first two years:
- Four 200-level physics courses — PHY 217, 235, and 238 and one chosen from among the following: PHY 218, 227, 243, 247.
- One of the following: another 200-level physics course; PHY 391 or 393; any 200-level astronomy course.
- Two additional courses which can be 200-level physics or astronomy courses, 200-level mathematics courses, or other science or engineering courses (not necessarily at the 200 level).

B.S. PROGRAM (PHYSICS)
Requirements beyond the first two years:
- PHY 217, 218, 227, 235, 238, 247 (or their close equivalents); PHY 243; one other 200-level physics course (one of the 250-series courses is recommended).
- Two advanced courses in mathematics (MTH 281 or ME 201 is required; MTH 282 or ME 202 is recommended).
- Computer literacy. This requirement can be satisfied either by receiving a passing grade in an introductory computing course; by satisfactorily completing a computer problem approved by the Director of Undergraduate Studies, possibly one from a previous class; or by having a faculty member familiar with the student's work recommend that the Director of Undergraduate Studies certify computer literacy on the basis of computing experience accumulated in work with a research project.

Students with a prior knowledge of differentials and integrals should take PHY 121 in the fall; others should take it in the spring. A synopsis of a typical program for the B.S. in physics follows:

First Year
- PHY 121 or elective
- MTH 161
- English requirement
- Elective

Second Year
- PHY 122 or 142
- MTH 164
- Foreign language
- Elective

Third Year
- PHY 217
- PHY 235
- ME 201 (or MTH 281)
- Elective

Fourth Year
- PHY 243
- PHY 247
- Elective
- Elective

REQUIREMENTS FOR A MINOR IN PHYSICS
- An introductory sequence: typically PHY 121, 122 (or 142), and 123 (or 143).
- Any three of the following courses: 217, 218, 227, 235, 238, 243, 247, 25X. Course 25X may be any one of the 250 series.

For admission to the minor, a student must have attained an average of at least 2.0 in the introductory sequence and at least 2.0 in all introductory mathematics courses taken.

The selection of advanced courses is to be approved by the Director of Undergraduate Studies in Physics, who will be concerned with the general coherence of the program, the student's plans to take necessary mathematical prerequisites, and mutual reinforcement between the minor and the student's major studies.

REQUIREMENTS FOR A MINOR IN ASTRONOMY
- An introductory physics sequence: typically PHY 121, 122 (or 142), and 123 (or 143).
- One of three descriptive astronomy courses: AST 102, 104, or 111; AST 111 is preferred.

*Most students can complete their foreign language requirements with one term of college work. Students who need more than one course must take the additional work in place of electives.
• The introductory astrophysics course: AST 142.
• Any two 200-level astronomy courses. (Four of these are offered on a two-year cycle. These courses usually require concurrent or prerequisite registration in 200-level mathematics and physics courses.)

For admission to the minor, a student must have attained an average of at least 2.0 in the introductory 100-level astronomy courses and normally at least 2.0 in the introductory physics and mathematics courses taken.

Concentrators in physics may elect a minor in astronomy.

CONCENTRATION IN PHYSICS AND ASTRONOMY

The programs leading to the B.A. and B.S. degrees in physics and astronomy are effectively double degree programs and are generally similar to the corresponding programs in physics. Students planning to pursue graduate study should elect the B.S. program; they are encouraged to take advantage of opportunities for reading or research provided by AST 391 and 393 in the senior year. The program as described below may be modified to fulfill the students’ legitimate academic goals.

Approval from the astronomy advisor is required for all degree programs. The 200-level astronomy courses are offered in a two-year cycle.

GENERAL REQUIREMENTS

Requirements for the first two years are the same as those for the B.A. and B.S. in physics, except that AST 111 and 142 are normally taken in place of the introductory Group II courses in the first year.

Background knowledge equivalent to that contained in AST 111 and 142 is necessary for the degree. AST 142 is recommended, but not required.

B.S. PROGRAM

Requirements beyond the first two years:
• Three of the following: AST 203, 232, 241, 242, including at least one of AST 241, 242.
• Six courses in physics at the 200 level or beyond: PHY 217, 227, 235, 238, 247 are recommended.
• Two courses in advanced mathematics: MTH 281, 282 or ME 201, 202 are recommended.
• All course choices must be approved by the undergraduate astronomy advisor.

Students with a prior knowledge of differentials and integrals should take PHY 121 in the fall; others should take it in the spring. A synopsis of a typical program for the B.S. in physics and astronomy follows:

**First Year**
- PHY 121 or elective
- PHY 137 or elective, or PHY 121
- MTH 161
- MTH 162
- AST 111
- English requirement
- Elective

**Second Year**
- PHY 122 or 142
- MTH 164
- Foreign language
- Elective

**Third Year**
- PHY 217
- PHY 235
- ME 201 (or MTH 281)
- AST 232
- Elective

**Fourth Year**
- PHY 247
- AST 393
- Elective
- Elective

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

PHYSICS

100. The Nature of the Physical World.
To acquaint students outside the sciences with some current ideas on the nature of the physical world. No prerequisites. (Fall and Spring)

103. Physics of Music. A study of the physical basis of musical phenomena. Theories of musical instruments, room acoustics, and special topics selected by the class and instructor. Two lectures and one lab per week. Half of labs devoted to individual student projects, often involving analysis of student instruments or of room acoustics. Course is open to any student with a strong interest in science and music. PHY 103 will satisfy a Group III (natural sciences) requirement. Prerequisite: consent of instructors.

113. General Physics I. Part of a two-semester sequence, suitable for students in the life sciences. Mechanics, thermodynamics, optics. Laboratory included and required. Calculus used sparingly and introduced as needed. Prerequisites: MTH 161 or 141 (may be taken concurrently). (Fall)

114. General Physics II. Electricity and magnetism, atomic and nuclear physics, electronics. Laboratory included and required. Prerequisite: PHY 113; MTH 162 or 142 desirable. (Spring)

121. Mechanics. First course for all students intending to major in physics, other physical sciences, and engineering. Newton's laws of motion, conservation of energy and momentum, gravitation, thermodynamics. Laboratory included and required. Prerequisites: MTH 141 or MTH 161 or equivalent, students with a prior introductory knowledge of calculus (simple integration and differentiation) can take MTH 161 or MTH 142 concurrently. (Fall and Spring)

122. Electricity and Magnetism. From Coulomb's Law through the integral form of Maxwell's equations. Laboratory included and required. Prerequisites: PHY 121; MTH 162 or MTH 143, or the equivalent (may be taken concurrently). (Fall)

123. Modern Physics. Electromagnetic waves, interference and diffraction, historical development of modern physics, relativity, introduction to quantum mechanics and applications thereof. Laboratory included and required. Prerequisites: PHY 121; PHY 122 (may be waived with departmental permission); MTH 163 or 164 (may be taken concurrently). (Spring)

**Most students can complete their foreign language requirements with one term of college work. Students who need more than one course must take the additional work in place of electives.**
137. Elements of Quantum Mechanics. Introduction to the nonclassical aspects of quantum mechanics at the same mathematical level as PHY 121. Wave-particle duality, de Broglie waves, Schrödinger’s wave equation, probabilistic interpretation, particle waves and wave packets in a one-dimensional box, uncertainty principle, photon polarization, photon counting and interference “paradoxes,” and reality vs. locality. Prerequisites: performance at or above the “B-” level in PHY 121 or by petition; MTH 161 or the equivalent. Open to freshmen and others by permission of the instructor.

142. Electricity and Magnetism. Topics same as those of PHY 122 but at greater depth. Recommended for prospective departmental concentrators and other science and engineering students with strong physics and mathematics aptitudes. Laboratory included and required. Prerequisites: PHY 142 or permission of the Department, for which B- or better performance in PHY 121 or 122 will be required; MTH 163 or 164 (may be taken concurrently).

217. Intermediate Electricity and Magnetism I. Fields, potentials, multipoles, dielectrics, induction. Maxwell’s equations. Prerequisites: PHY 122 or 142; advanced calculus taken concurrently. (Fall)

218. Intermediate Electricity and Magnetism II. Electromagnetic waves, reflection and refraction, waveguides and resonant cavities, radiation, dispersion, electromagnetism. Prerequisites: PHY 217; advanced calculus taken concurrently. (Spring)

227. Thermodynamics and Introduction to Statistical Mechanics. A survey of thermodynamics, from both the classical and the statistical points of view. Prerequisites: advanced calculus (may be taken concurrently). (Spring)

235. Classical Mechanics. Potential theory. Lagrangian dynamics, central forces, coordinate transformations, rigid-body motion. Prerequisite: advanced calculus (may be taken concurrently). (Fall)

236. Advanced Classical Mechanics. Special relativity, scattering theory, Hamiltonian dynamics, small oscillations, continuous media. Prerequisite: PHY 235. (Spring)

238. Quantum Theory I. Origins of quantum theory, Schrödinger’s equation, approximation methods, identical particles and spin. Prerequisites: PHY 235, ME 201, or MTH 281. (Spring)

243. Advanced Laboratory I. Approximately six classic experiments in atomic, nuclear, and condensed matter physics. Lectures on statistics, detector theory, electronic functional assemblies, scattering theory. Prerequisites: PHY 217 and 238 (may be taken concurrently). (Fall)

244. Advanced Laboratory II. A continuation of PHY 243, which is a prerequisite.

247. Quantum Theory II. Formal quantum mechanics, symmetries and angular momentum, electromagnetic interactions and selection rules, scattering. Prerequisite: PHY 238. (Fall)

250. Advanced Laboratory Projects. Similar in level to PHY 243 and 244, but based on extended experimental projects by students as individuals or in small groups. Prerequisite: PHY 243.

252. Biological Physics. Physical aspects of special topics in biology. Prerequisites: PHY 227, 238


255. Physics in Modern Technology. Microelectronics and applications to computers, modern communications systems, energy demand and generation. Prerequisite: PHY 121, 122, 123, or equivalent.

258. Energy and Environment. A broad survey of the energy-environment field, for science and engineering concentrators. Prerequisites: three semesters of physics, two semesters of math.


262. Physical Optics II. See OPT 262.

322. Computational Physics. Introduction to the modeling of physical systems by computer. Introduction to basic numerical methods to solve integrals, differential equations, boundary and eigenvalue problems of physics. Applications to nonlinear dynamics and chaos, random walks, magnetostatics, Schrödinger equation. Prerequisites: ME 201 or MTH 281, PHY 217, PHY 235, PHY 238 (may be taken concurrently). Some previous experience with computers needed.

383. Special Topics in Physics. Selected topics offered when justified by sufficient interest.

390. Supervised Teaching of Physics. Credit—2 hours. Introduction to the techniques of physics instruction, active observation, and participation in the teaching of an undergraduate course under the guidance of a faculty member. Prerequisite: Department and instructor's permission.


393. Senior Project. Completion of an independent research project under the direction of a faculty member.

ASTRONOMY

102. Topics in Modern Astronomy. To acquaint the nonphysical science concentrator with developments of interest in modern astronomy. Primarily concerned with studies of the evolution of the stars, of material between the stars and of the large-scale structure and origin of the universe. (Fall)

104. Topics in Space Sciences. To acquaint the nonphysical science concentrator with aspects of the historical and modern study of the solar system, including results from space probe studies, and with theories dealing with the evolution of the solar system. (Spring)

111. Elementary Astronomy I. An introductory survey of observational astronomy intended for physical science majors. Typical topics include: celestial mechanics and planetary structure, properties of stars, stellar evolution, galactic structure, galaxies, cosmology. Includes required laboratory sessions. The course is open to freshmen. (Fall)

142. Elementary Astrophysics. Covers the sun, nuclear energy sources, stars, nebulae, galaxies. For sophomore science majors. Makes use of first-year physics and calculus. The emphasis is on understanding the physics involved in astrophysical phenomena. The course includes required laboratory sessions. Prerequisites: PHY 121; PHY 122 (may be concurrent) or 142; MTH 161, 162; AST 111 recommended. (Spring)

203. Experimental Techniques in Astronomy. An introduction to the devices and techniques used in modern observational astronomy. Covers: Geometrical and wave optics applied to telescopes; detection of light, radio through gamma rays; CCDs and related devices; quantum noise and the sensitivity of detectors; astronomical photometry and spectroscopy; radio-astronomical interferometry and speckle interferometry. Prerequisites: PHY 121-123, MTH 161-164 or 171-174, PHY 217 (or concurrent enrollment), MTH 281 (or concurrent enrollment).

232. Dynamics and Statistics of Star Systems. The motions of stars are studied and are used to discover and interpret the dynamic properties of our galaxy. Familiarity with PHY 235 and AST 142 is advised. (Fall)

241. Astrophysics I. Structure of stellar atmospheres and interiors; interpretation of spectra; stellar evolution. Prerequisite: PHY 238 (may be taken concurrently). (Spring)

242. Astrophysics II. Physical processes in the interstellar medium; structure of galaxies; introduction to cosmology. Prerequisite: PHY 238 (may be taken concurrently). (Spring)

383. Special Topics in Astronomy. Selected topics offered when justified by sufficient interest.


393. Senior Project. Completion of an independent research project under the direction of a faculty member.
POLITICAL SCIENCE

David Austen-Smith, Ph.D. (Cambridge)  Professor of Political Science
Jeffrey S. Banks, Ph.D. (California Institute of Technology)  Professor of Political Science and of Economics
Bruce J. Bueno de Mesquita, Ph.D. (Michigan)  Professor of Political Science
Randall Calvert, Ph.D. (California Institute of Technology)  Professor of Political Science and Chair of the Department
Richard F. Fenno, Jr., Ph.D. (Harvard)  William Kenan Professor of Political Science and Distinguished Professor of Arts and Science
Eric A. Hanseke, Ph.D. (M.I.T.)  Professor of Economics, of Political Science, and of Public Policy
Bruce Jacobs, Ph.D. (Harvard)  Professor of Political Science and of Public Policy  Director of the Public Policy Analysis Program
*John Mueller, Ph.D. (California, Los Angeles)  Professor of Political Science and of Film Studies
Richard G. Niemi, Ph.D. (Michigan)  Professor of Political Science
Samuel C. Nolushungu, Ph.D. (Manchester)  Professor of Political Science and African Politics
Charles E. Phelps, Ph.D. (Chicago)  Professor of Political Science, of Economics, of Public Policy, and of Community and Preventive Medicine
G. Bingham Powell, Jr., Ph.D. (Stanford)  Professor of Political Science
Tyll van Geel, Ed.D. (Harvard)  Professor of Education and of Political Science
David L. Weimer, Ph.D. (California, Berkeley)  Professor of Political Science and of Public Policy
Lynda W. Powell, Ph.D. (Rochester)  Associate Professor of Political Science
Lawrence S. Rothenberg, Ph.D. (Stanford)  Associate Professor of Political Science and of Public Policy
Harold W. Stanley, Ph.D. (Yale)  Associate Professor of Political Science
Edward J. Bird, Ph.D. (Wisconsin)  Assistant Professor of Political Science and of Public Policy
James D. Johnson, Ph.D. (Chicago)  Assistant Professor of Political Science
Melanie Manion, Ph.D. (Michigan)  Assistant Professor of Political Science
Andrew Dick, Sc.B. (Brown)  Instructor in Political Science and in Public Policy
Gerald Gamm, A.B. (Harvard)  Instructor in Political Science

Renée Smith, M.A. (Michigan State)  Instructor in Political Science
Walter Broadmax, Ph.D. (Syracuse)  Adjunct Professor of Political Science and Public Policy
William H. Bristol, J.D. (Vanderbilt)  Adjunct Associate Professor of Political Science
G. Bingham Powell, Jr., Ph.D. (Rochester)  Adjunct Associate Professor of Political Science
William T. Bluhm, Ph.D. (Chicago)  Professor Emeritus of Political Science
S. Peter Regenstreif, Ph.D. (Cornell)  Professor Emeritus of Political Science and Canadian Studies
Glenn Gordon Willey, Ph.D. (Chicago)  Professor Emeritus of Political Science

The Department uses six to eight teaching assistants in PSC 101 and 102 to assist in grading and conducting recitation sessions.

The Department of Political Science offers programs leading to the B.A. degree, the B.A. degree with honors, and, at the graduate level, the M.S. (public policy) and Ph.D. degrees.

The Department is regularly ranked in the top handful of political science departments in the country. In its ranks are two former presidents of the American Political Science Association, a member of the Institute of Medicine, two members of the National Academy of Sciences, four fellows of the American Academy of Arts and Sciences, and seven Guggenheim fellows. The American Political Science Association's Woodrow Wilson Foundation Prize for the year's best book in the field has been won three times in the last dozen years by Rochester political scientists.

Social science, as a whole, offers generalizations about human behavior, motives, interactions, goals, etc. It differs from those approaches that interpret unique events. In this sense it is simply an empirical study of the natural world. In this sense it is simply one among many liberal studies. But it also has a professional application, in the sense that the portion of nature studied is of particular interest to those planning a career in law, government, and business management. To this end, the Department offers a 3-2 program in public policy analysis, in which a student can earn both a bachelor's degree in his or her undergraduate major and a master's degree in policy analysis in five years. Students may also wish to take advantage of the option to participate in the Model UN in New York. Furthermore, the Department sponsors a number of internship opportunities with the local district attorney and public defender, the U.S. House of Representatives, and the British House of Commons.

CONCENTRATION REQUIREMENTS IN POLITICAL SCIENCE

PSC 101 and 102 are recommended, but not required, for concentration. One of these courses may be counted toward the elective part of the concentration, but neither may be used to satisfy the distribution requirement (a–d. below).

A total of 11 courses is required:

1. Eight courses in political science of which at least seven must be beyond 100. Of the seven advanced courses, four must be distributed as follows:

   a. One course in techniques of analysis. PSC 200 or 201 is recommended, but this requirement may also be satisfied by STT 165, 203, or 211 or ECO 231. Students should attempt to fulfill this requirement before the end of the first semester of their junior year.

   b. One course in either American politics or public policy (Group B or C).

   c. One course in either comparative politics or international relations (Group D or E).

   d. One course in political theory (Group F).

PSC 272 and 372 can be used either for c. or d. PSC 341 can be used either for b. or d. No single course may be used to satisfy two of the distribution requirements.

Summer school courses taught by graduate students may be used to satisfy the elective and/or techniques of analysis, but not the distribution requirements b.–d. No course, other than statistics courses, transferred from other schools, may be used to satisfy the distribution requirement.

*Has applied for one or two semesters of leave in 1993–94
Students with AP credit in politics courses may use such courses in lieu of PSC 101 or 102 if they received a score of 4 or 5.

2. Three courses beyond the introductory level in an allied field. Acceptable fields include anthropology, computer science, economics, history, philosophy, psychology, and statistics (see department handbook for more details). All allied field courses typically are taken in the same department, but an allied field that is composed of a mixture of courses from different departments can sometimes be substituted with the permission of the faculty advisor.

REQUIREMENTS FOR A MINOR IN POLITICAL SCIENCE

Five courses are required:

• PSC 200, Applied Data Analysis, or PSC 201, Political Inquiry (ECO 231, STT 165, 203, or 211 may not be used to fulfill this requirement.)
• One course in formal theory/political philosophy (Group F) or PSC 272
• PSC 101, European Political Systems or another course in international relations (Group E) or comparative politics (Group D)
• PSC 102, The American Political System, or another course in American politics (Group B) or public policy (Group C)
• One additional 200-level course

At least four of the five courses in the minor must be above the 190 level.

THE 3-2 PROGRAM IN PUBLIC POLICY ANALYSIS

Many individuals are motivated to study the social sciences by the possibility of eventually pursuing careers related to some phase of the development, implementation, or evaluation of public policy. The Public Policy Analysis Program is an interdisciplinary program designed to develop the mixture of skills required by individuals who wish to enter this field. The training combines the analytical methods of economics and political science, statistical techniques, knowledge of particular substantive areas, and practical experience. Graduates take jobs in both government (at all levels) and the private sector where their skills are in demand.

The program, which leads to an M.S. (public policy) degree, normally requires two years to complete. However, a limited number of undergraduates also may take the program as a 3-2 option. Students interested in this program should consult the Public Policy Analysis Program description on page 123. Applications and further information can be obtained in 334 Harkness Hall.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. European Political Systems. A comparative study of the political process of selected European states, including Great Britain, France, and the Soviet Union. (Fall)

102. The American Political System. An analysis of the process of political conflict, bargaining, coalition formation, and institutions in the U.S. (Spring)

300. Junior/Senior Seminar. Prepare for and write a research paper based on a topic chosen by the student and approved by the instructor. Open to juniors and seniors, with permission of the instructor. (Fall and Spring)

391. Independent Study. Work beyond the regular course offerings is done by arrangement with the Department.

393. Senior Honors Project. See Honors Program description on page 117. (Fall and Spring)

394. Internships. Combined work-study in the public defender's or district attorney's office. Public policy internships with the City of Rochester are also available for qualified students.

396. Washington Semester Program. One semester's work in Washington, D.C., as a member of the staff of a U.S. Senator or Representative.

397. European Political Internship. Generally available for one semester in London working for a member of Parliament or in another political placement. For students with appropriate language preparation, internships may be available in Brussels, Bonn, Madrid, and Paris.

GROUP A: TECHNIQUES OF ANALYSIS

200. Applied Data Analysis. Introduces use of the computer in substantive political science applications. (Fall)

201. Political Inquiry. Introduction to the philosophy of science and scientific approaches to politics; applications in critical analysis and original research. (Spring)

403. Mathematical Modeling. An introduction to mathematical applications in political science. (Fall)

404. Introduction to Statistical Methods. Statistical methods for political science. (Fall)

405. Multivariate Statistical Methods. Additional instruction in statistical methods, with special emphasis on the theory and application of multiple regression analysis as it applies to politics. (Spring)

406. Design and Analysis of Survey Studies. Rationale and methods for survey studies of political behavior. Planning stage, collection, processing, and analysis of data. (Fall*)

460. Benefit-Cost Analysis. Studies modern methods of cost-benefit and cost-effectiveness analysis. (Fall*)

GROUP B: AMERICAN POLITICS

209. Interest Groups in America. Introduction to topics that concern political scientists and economists about interest groups in American politics. (Fall)

217. Politics and Mass Media. The interaction of politics and mass media, focusing on techniques of opinion manipulation, campaigning, and the use of polls. (Spring)

219. The Constitution: Then and Now. A study of the events and ideas involved in the writing of the U.S. Constitution and a consideration of the present form of the Constitution in operation. (Fall)

222. The Presidency. A study of recent presidential campaigns and presidential leadership in both foreign and domestic policy. (Fall)

223. Constitutional Politics. A study of judicial decision making, with emphasis on civil rights and liberties. (Spring)

246. Women in Politics. Examines the participation of women in American political life. Same as WST 211. (Fall)

247. Women and the Law. Examines sex discriminatory aspects of statutory, judicial, and administrative rules of law. Same as WST 247. (Spring)

249. Professional Sports and the American City. Examines the relationship between sports and American urban life in the twentieth century. Same as HIS 249. (Spring)

330. Urban Life and Urban Politics. An advanced seminar on major issues in the study of urban politics. Same as HIS 331. (Spring)

*PSC 406 is taught Sept.-Oct. and PSC 460 from Oct. - Dec. Each course is 2 credit hours.
GROUP C: PUBLIC POLICY

235. Organizational Theory and Behavior. An analysis of individual and collective behavior in public and private organizations. Various explanations of bureaucratic decision making and performance are considered. (Spring)

237. Domestic Social Policy. The content, rationale, assumptions, and development of selected domestic policies. The use of social science theories and findings in policy formation and evaluation. (Fall)

239. Family Policy in the U.S. General framework for analyzing family policy and its history in the United States as well as specific policy areas such as child care, foster care, and adolescent pregnancy. Same as WST 239. (Fall)

240. Criminal Procedures and Constitutional Principles. An examination of statutory and constitutional criminal procedure issues. (Spring)

242. Technology and Development in the Third World. Exploration of the role of technology in the Third World, and factors affecting technological development. (Spring)

245. Aging and Public Policy. Covers policies in such areas as social security, public assistance, health care, and social services for the elderly. Same as PPA 445. (Spring)

248. Risk and Insurance. Applies theories of risk and insurance to issues of public policy. Same as ECO 248. Prerequisites: ECO 207 and calculus. (Spring)

GROUP D: COMPARATIVE POLITICS

252. Politics in Canada. An analysis of the Canadian political system. Comparisons with British and United States systems are stressed. (Fall)

259. Comparative Social Policy. Examines the recent history of social policy in Western Europe and the United States. Directions of social policy in the formerly socialist countries of Eastern Europe are also discussed. Same as ECO 259. (Spring)

260. Political Change in Communist Systems. A comparative study of politics in selected states, including the former Soviet Union and the People's Republic of China. (Fall)

263. Black Intellectuals and the Crisis of the Twentieth Century. Considers major political thinkers in the United States, Africa, and Caribbean, by placing their work in historical context. Same as AAS 205. (Fall)

264. Comparative Political Corruption. An examination of the causes and consequences of political corruption in different institutions and political systems. (Spring)

266. State and Society in Africa. Examines critical issues in Africa, political and economic trends, with particular emphasis on the relationship between states and societies. (Spring)

267. Politics in China. An introduction to the political process in the People's Republic of China, with a brief survey of its political history. (Spring)

GROUP E: INTERNATIONAL RELATIONS

269. South African Politics. Examines the nature of apartheid in light of its imminent end; the difficulties of transition; interplay of race and class; and the project of a democratic constitution. (Fall)

363. Advanced Seminar on Black Intellectuals and the Crisis of the Twentieth Century. This is an advanced readings and research course designed for students who have taken PSC 263 or an equivalent acceptable to the instructor. Same as AAS 305. (Spring)

GROUP F: POLITICAL THEORY

280. The Greek and Roman Political Classics. A detailed comparative study of Thucydides, Plato, and Aristotle. Comparisons with modern political theories. (Fall)


282. Introduction to Positive Political Theory. An introduction to some recent developments in explaining and evaluating government behavior. Same as ECO 282. (Fall)
SEMINARS IN POLITICAL SCIENCE

Qualified students are urged to consider taking a 300-level seminar during the junior or senior year. Classes are a mixture of graduate and undergraduate students and typically number about 10.

Students should make plans well in advance, since not all seminars are offered every year. These seminars carry 4-8 hours of credit. Enrollment and course credit require permission of the instructor.

300. Junior/Senior Seminar.
305. Advanced Statistical Methods.
310. Political Parties and Elections.
312. Organizations and Politics.
313. Public Opinion and Public Policy.
314. Congress as an Institution.
315. Legislative Behavior.
316. American Politics.
341. Ethics and Public Policy.
350. Problems in Comparative Politics.
351. Western European Politics.
358. Topics in Comparative Communism.
363. Advanced Seminar on Black Intellectuals and the Crisis of the Twentieth Century.

THE HONORS PROGRAM

Students wishing to graduate with honors in political science must fulfill the normal requirements of the undergraduate concentration, have a cumulative average of 3.0 in political science courses, and must in addition:

a. Complete a 300-level seminar in an area related to the subject of the honors project, preferably in the junior year.

b. Enroll in a year-long course sequence entitled PSC 393, Senior Honors Project.

c. Within the context of this course, do research and write an honors paper describing the results of the research, which may take the form of data analysis, library research, or an experiment or survey.

d. Present the paper for review by a committee of two members of the department. The final draft of the honors paper must be presented no later than the last day of classes of the spring semester.

The instructor with whom the candidate works on the honors project will assign course grades for the two semesters of the project. The two courses may be counted by the student as electives in fulfilling the requirements of the undergraduate concentration in political science. But the award of honors will be separately determined by the department review committee. The department encourages prospective honors students to apply for the honors program during the spring semester of the junior year by consulting and gaining the consent of a department faculty member willing to direct the honors work. The final honors project will be presented no later than the last day of classes of the spring semester.

NOTE: Students wishing to do a semester-long research project rather than a full honors project should consider taking PSC 300, Junior/Senior Seminar.

PSYCHOLOGY

Robert Ader, Ph.D. (Cornell) Professor of Psychobiology and of Psychology
Richard Aslin, Ph.D. (Minnesota) Professor of Psychology and of the Center for Vision Science
Thomas G. Bever, Ph.D. (MIT) Professor of Psychology and of Linguistics
Robert Chapman, Ph.D. (Brown) Professor of Psychology and of the Center for Visual Science
Paul Coleman, Ph.D. (Rochester) Professor of Neurology and of Psychology
Emory L. Cowen, Ph.D. (Syracuse) Professor of Psychology, of Psychiatry, and of Education and Human Development
Philip W. Davidson, Ph.D. (George Washington) Professor of Pediatrics and of Psychology
Edward L. Deci, Ph.D. (Carnegie Mellon) Professor of Psychology
Robert W. Doty, Ph.D. (Chicago) Professor of Physiology and of Psychology
Barbara Ilardi, Ph.D. (Stanford) Professor of Sociology in Psychology
James R. Ison, Ph.D. (Michigan) Professor of Psychology and of Toxicology and in the Center for Visual Science
Carl Kellogg, Ph.D. (Rochester) Professor of Psychology and Associate Professor of Pharmacology
Rafael Klorman, Ph.D. (Wisconsin) Professor of Psychology
Victor G. Laties, Ph.D. (Rochester) Professor of Biophysics, of Pharmacology, and of Psychology
Peter Lennie, Ph.D. (Cambridge) Professor of Psychology and in the Center for Visual Science
*Walter Makous, Ph.D. (Brown) Professor of Psychology, in the Center for Visual Science, and of Ophthalmology
Dale W. McAdam, Ph.D. (Iowa) Professor of Psychology
Elissa Newport, Ph.D. (Pennsylvania) George Eastman Professor of Psychology
Harry Reis, Ph.D. (New York) Professor of Psychology and Associate Professor of Education and Human Development

*Has applied for one or two semesters of leave in 1993-94
Richard Ryan, Ph.D. (Rochester)  Professor of Psychology
Jerome S. Schwartzbaum, Ph.D.  (Stanford)  Professor of Psychology
Michael K. Tanenhaus, Ph.D.  (Columbia)  Professor of Psychology
Bernard Weiss, Ph.D. (Rochester)  Professor of Biophysics and of Psychology
Ladd Wheeler, Ph.D. (Minnesota)  Professor of Psychology
David Williams, Ph.D. (California, San Diego)  Professor of Psychology, in the Center for Visual Science, and of Optics
Miron Zuckerman, Ph.D. (Harvard)  Professor of Psychology
Craig Barclay, Ph.D. (Illinois, Urbana-Champaign)  Associate Professor of Education and Human Development and of Psychology
Lucia French, Ph.D. (Illinois)  Associate Professor of Education and Human Development and of Psychology
Mary Hayhoe, Ph.D.  (California, San Diego)  Associate Professor of Psychology and in the Center for Visual Science
Ernest J. Nordeen, Ph.D. (California, Irvine)  Associate Professor of Psychology and of Neurobiology and Anatomy
Kathy W. Nordeen, Ph.D. (California, Irvine)  Associate Professor of Psychology and of Neurobiology and Anatomy
Deborah Ossip-Klein, Ph.D.  (Pittsburgh)  Associate Professor of Psychology
Tatiana Pasternak, Ph.D. (Copenhagen)  Associate Professor of Neurobiology and Anatomy, of Psychology, and in the Center for Visual Science
Allan J. Schwartz, Ph.D. (Rochester)  Associate Professor of Psychiatry and of Psychology, Psychologist, University Health Service
Judith Smetana, Ph.D. (California, Santa Cruz)  Associate Professor of Education and Human Development and of Psychology
Sharon Carver, Ph.D. (Carnegie Mellon)  Assistant Professor of Education and Human Development and of Psychology
Crystine Chandlee, Ph.D. (Denver)  Assistant Professor of Education and Human Development and of Psychology
Robert Cole, Ph.D. (Cornell)  Assistant Professor of Psychiatry and of Psychology
Robert C. Emerson, Ph.D. (Pennsylvania)  Senior Scientist in Ophthalmology and in the Center for Visual Science and Assistant Professor of Psychology*

Robert A. Jacobs, Ph.D. (Massachusetts)  Assistant Professor of Psychology
Kenneth E. Clark, Ph.D. (Ohio State)  Dean Emeritus of the College of Arts and Science and Professor Emeritus of Psychology
Vincent Nowlis, Ph.D. (Yale)  Professor Emeritus of Psychology
S. D. Spragg, Ph.D. (Yale)  Professor Emeritus of Psychology
Garth Thomas, Ph.D. (Harvard)  Professor Emeritus of Psychology, and of Neurology
Melvin Zax, Ph.D. (Tennessee)  Professor Emeritus of Psychology and Senior Faculty Associate

The Department uses teaching assistants as discussion group leaders in large courses.

The Department of Psychology offers programs of study leading to B.A. and Ph.D. degrees.

Instruction is offered throughout the broad spectrum of behavior-related science. Its content covers technical, theoretical, and empirical presentations of psychology as a natural science and as a social science. Application of these various aspects of the discipline to health and to the helping professions is a common theme. Student experiences may range from large lecture courses to individual laboratory and practicum situations. Individual programs may be tailored to provide excellent background for postgraduate work in psychology, medicine, education, social work, law, and other related social and natural sciences.

Students planning to pursue graduate study in psychology are advised to seek a broad foundation in such closely related disciplines (e.g., biology, chemistry, mathematics, philosophy, sociology, education) as may be appropriate to their individual goals and interests. Further, they are strongly advised to enroll in laboratory courses and individually supervised research work.

In addition to standard course offerings, students may pursue their interests through individual reading and research arrangements with faculty and internships. Course credit may be awarded for these activities. While most special offerings are aimed at students intending to do graduate work in psychology or related disciplines, other interested students are not excluded.

An undergraduate student may register for graduate-level courses with the permission of the advisor and the course instructor.

GENERAL COURSE INFORMATION

Successful completion of the introductory survey course in psychology is a prerequisite to all other courses in psychology and to acceptance in the concentration program. This requirement may also be met by passing an exemption exam.

Laboratory courses and practica are designed primarily, but not exclusively, for the concentrator in psychology and other behavioral sciences.

Areas are indexed by the second digit in the course numbers. Courses numbered in the 20s through 50s are natural science psychology courses and fall into the College Distribution Group III. Courses numbered in the 60s through 80s are social science psychology courses and fall into the College Distribution Group II. An independent study course is classified in one of these areas and also in Group II or Group III, according to its content.

REQUIREMENTS FOR CONCENTRATION IN PSYCHOLOGY

1. PSY 101 or the equivalent. This requirement must be completed before a student will be accepted as a concentrator. For Venture students only, PSY 218 is an acceptable substitute for PSY 101.

2. An acceptable statistics course, preferably by the end of the sophomore year. STT 211 is strongly recommended, but STT 165, 212, or 202–203 may also meet this requirement.

3. A minimum of 10 four-credit-hour courses in addition to PSY 101 and statistics, of which six to eight are from psychology and two to four are from an allied field. The minimum of six psychology courses may not include independent study courses numbered 390 through 395. No more than two courses may be transferred from other colleges.

4. The psychology courses must include at least two from the natural science core courses (131, 141, and 151) and at least two from the social science core courses (161, 171, and 181).

5. A student wishing to concentrate in psychology must offer acceptable arguments for the contribution to his or her program of the applied field courses, which may be from any other department of the University. The question to be answered is, "How do the allied field courses make the applicant a better, more informed student in his or her psychology courses?"

REQUIREMENTS FOR AN HONORS DEGREE IN PSYCHOLOGY

1. Courses taken must include one laboratory class, one upper-level seminar, and three honors courses: Honors Seminar, Honors Research I, and Honors Research II. These courses are described below.

2. Completion of the requirements for a psychology major with an average grade of at least 3.3 in all psychology courses (including the three honors courses) at the time of graduation.

*Part-time.
Six courses are required:

• PSY 101. Introduction to Psychology

• Three core courses, with at least one from the natural science and one from the social science psychology courses.

• Two additional courses (200 or 300 level). Independent study and practicum courses are acceptable.

2. Psychology as a Natural Science

Five courses are required:

• PSY 101. Introduction to Psychology

• Two core courses from the natural science psychology courses:
  - PSY 131. Cognition
  - PSY 141. Biopsychology
  - PSY 151. Sensation and Perception

• Two additional natural science psychology courses (200 or 300 level). Independent study and practicum courses are acceptable.

3. Psychology as a Social Science

Five courses are required:

• PSY 101. Introduction to Psychology

• Two core courses from the social science psychology courses:
  - PSY 161. Social Psychology
  - PSY 171. Developmental Psychology
  - PSY 181. Psychology of Personality

• Two additional social science psychology courses (200 or 300 level). Independent study and practicum courses are acceptable.

4. Organizational Psychology

Five courses are required:

• PSY 101. Introduction to Psychology

• PSY 161. Social Psychology

• PSY 181. Psychology of Personality

• PSY 264. Psychology of Business and Industry

• One course from any of the following:
  - Human Motivation and Emotion
  - Leadership and Management II

Any 300-level social psychology seminar, independent study, or a practicum in organizational psychology.

5. Health Psychology

Six courses are required:

• PSY 101. Introduction to Psychology

• PSY 141. Human Biopsychology

• PSY 181. Psychology of Personality

• PSY 282. Abnormal Psychology

• PSY 283. Behavioral Medicine

• One course from any of the following:
  - PSY 289, 382, 383.

Any advanced biopsychology course, independent study, or other approved course or practicum.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. Introduction to Psychology. A survey. Lectures and class discussions supplemented by demonstrations. Prerequisite to all courses in psychology. (Fall and Spring)

218. Explaining Behavior. This Venture course deals with the nature of psychological explanations through the presentation and discussion of numerous examples. (Spring)

CORE COURSES

Natural Science


141. Biopsychology. A survey of biological insights and implications for our understanding of human behavior. Same as COG 141. (Spring)

151. Sensation and Perception. Introduction to the fundamental facts, methods, and theories about sensing stimulation, processing information, and perceiving objects in the environment. Psychophysical and physiological aspects of vision, audition, taste, smell, and skin senses are included. (Fall)

Social Science

161. Social Psychology. Broad issues such as social perception, interaction, group dynamics, attitude change and social influence, emotions, and others covered. (Fall)

171. Developmental Psychology. An introductory course which focuses on a number of important and controversial issues in developmental psychology across the life span. (Spring)

181. Psychology of Personality. A survey of personality, emphasizing modern theoretical approaches, basic methods of investigation, and current research findings. (Fall)

LABORATORY COURSES

219W. Research Methods in Psychology. A broad survey of research strategies used in the social sciences. Course includes individual student experimental research. (Fall)

237W. Lab in Cognition. Theory and research concerning human intellectual functioning. (Fall)

256W. Lab in Perception. Fundamental perceptual processes investigated through laboratory demonstrations and student-conducted experiments. Prerequisites: CVS or PSY 151 and statistics, or permission of the instructor. Same as CVS 256. (Spring)

266. Lab in Social Psychology. Individual behavior in social contexts, with selected experiments which illustrate research methods and techniques. Prerequisites: PSY 161 and STT 211. (Fall)

375W. Lab in Developmental Psychology. Considers several modules illustrating major experimental paradigms to study infant development and includes individual projects. Same as WST 209. (Spring)

ADVANCED LECTURE COURSES

209. Psychology of Human Sexuality. Survey course on understanding sexuality. Includes such topics as biological sexual differentiation, gender role, gender-linked social behaviors, reproduction issues, intimacy, and the role of personal and social factors in psychosexual development. Same as WST 209. (Spring)

231W. Human Learning and Memory. Research and theory on the acquisition, retention, recognition, and recall of information by adults. (Fall)

234. Psychology of Language. This course is concerned with the psychological processes involved in language use. Topics covered include comprehension, production, acquisition, and applied psycholinguistics. (Fall)

241. Neurobiology of Behavior. Survey of biological substrates of behavior focusing on integrative mechanisms of the brain and their expression in sensory, motoric, motivational, and mnemonic functions. Same as NSC 241. (Fall)

243. Neurochemical Foundations of Behavior. Biochemical basis of brain function. Suggested prerequisites: PSY 141 or PSY 241 or NSC 201; BIO 150 or IND 401. Same as NSC 243. (Fall)

255. Sensory Systems. A large part of the brain is concerned with the analysis of information that impinges on the sense organs. This course deals with the operation of the sense organs—the principles of their operation and how their environment balances conflicting demands — and the subsequent analysis by higher centers of the signals sent by the sense organs. Prerequisite: permission of the instructor. Same as CVS 235. (Spring)

262. Human Motivation and Emotion. A study of the motivational and emotional processes and theories that underlie both adaptive and maladaptive behavior. Includes consideration of research largely with human subjects. (Spring)
264. Psychology in Business and Industry. Applications of psychological findings and methods to problems encountered in business, industry, and the professions. Prerequisites: PSY 161 and STT 211 or equivalent. (Fall)

267. Gender Differences in Social Behavior. Exploration of the ways males and females differ in interaction, theories of development of sex differences, consequences for social change. Same as WST 272. (Fall)

272. Cognitive Development. A survey of the field of cognitive development from birth to adolescence. Topics include parameters of attention in infancy, early concepts of number, time, space, cognitive styles, language development, information-processing models of problem solving, and Piaget’s theory. (Fall)

273. Perceptual Development. Survey of recent research and theory in sensory and perceptual development in humans and animals. Emphasis on visual and auditory development in human infants. Prerequisites: PSY 101, STT 211. Recommended: PSY 151, 171. (Fall)

274. Language Development. A basic introduction to children’s language development, including the acquisition of phonology, syntax, and semantics. The course focuses on the acquisition of a first language by young children, comparing the acquisition of a variety of spoken and signed languages to find possible universal principles of language learning. (Spring)

277. Social Development. Study of the socialization of children and the development of social behavior. Prerequisite: PSY 171 or equivalent. (Spring)

278. Adolescent Psychology. A survey of psychological theory and research relating to normal development during adolescence including biological, social, and intellectual development. (Fall)

282. Abnormal Psychology. Etiological factors, clinical descriptions, and treatment of personality aberrations, emphasizing the more serious forms of mental disorder. (Spring)

283. Behavioral Medicine. An overview of the application of behavior/lifestyle change approaches to the treatment of medical disorders, and the examination of interfaces between behavior and physiology. Topics include diabetes, cardiovascular risk factors, chronic pain, and cancer. (Spring)

284. Freud and Jung. An introduction to the theories of Freud and Jung and their application to psychotherapy. (Fall)

289. Childhood Psychopathology. Behavioral disorders of childhood and adolescence and relevant research topics in developmental psychology. Prerequisites: PSY 171 and 181. (Spring)

318. Computers in Psychology Research. Programming, fundamentals, and experimental problems will be studied in didactic and practical situations. Same as CVS 318. (Spring)

369. Psychology of Women. This course is taught through both lecture and discussion. Examines sex differences and sex-role socialization; compares traditional and contemporary viewpoints of female development and function; covers areas such as identity, personhood, and mental health. Related topics include ethnicity, class, psychological oppression, and feminism. Same as WST 223.

**SEMINAR COURSES**

Prerequisites typically include the prior lecture course and/or permission of the instructor.

301. Teaching Psychology. In-depth consideration of topics in psychology and their communication. PSY 101 is a lab for this course. (Fall)

309. Honors Seminar. Taken in either the sophomore or junior year, involves presentation by various faculty describing their research, to be discussed by the class subsequently with the honors coordinator. By exposure to ongoing research, students are directed into their own independent honors research projects. Prerequisite: PSY 101. (Spring)

319. Self-Control and Study Behavior. The applications of behavioral psychology to study behavior are examined through readings and a practicum experience. Topics addressed include self-control and self-instruction, study improvement methods, basic counseling skills, and the comparative effectiveness of various experimental programs in treating maladaptive behavior. (Spring)

334. Sentence Processing. This seminar offers an in-depth examination of selected topics in language comprehension, including lexical processing, parsing, and anaphora resolution. Theoretical ideas from linguistics and artificial intelligence are integrated with experimental studies of language processing. Same as COG 301. (Spring)

341. Human Neuropsychology. A basic survey of the biological substrates of sensation, perception, simple and complex movement, regulatory and “heroic” behaviors, learning, memory, and cognition. An introduction to neuroanatomy, neurophysiology, and neurochemistry is included. (Spring)

342W. Issues in Human Biopsychology. Current views of biological explanations of human behavior are examined. Topics may include sexual dimorphism in the brain, pain, sociobiology as a force in human behavior, endowments of a cognition brain, etc. (Spring)

353. Human Factors. The sensory, motor, and information processing aspects of humans that need to be considered in connection with machines or other systems, ranging from typewriters and television to computers and airplanes, that interact with them. Same as CVS 353. (Spring)

361. Seminar in Social Psychology. Selected areas of current research in social psychology. (Fall and Spring)


365. Seminar on Group Dynamics and Organizational Behavior. Reviews basic theories of organizational behavior. (Pfeffer, Blau and Scott, Kanter, Deci, Argyris). Considers theories of group behavior in organizations (The Harvard School, Bales, Bavelas, Porter, Weick) and focuses on selected topics in the area, such as socialization and behavior, performance, communication dynamics in work groups, organizational demography and behavior, and leadership. Prerequisite: permission of the instructor. (Spring)

366. Social Psychology and Control. Determinants and consequences of the need for control and perceived control, and their relation to individual and social behavior.

368W. Humanistic Psychology. Humanistic psychology theory and its application to one’s life experiences. Requires active participation. (Fall)

371. Seminar in Developmental Psychology. Current research and theory in developmental and child psychology. (Fall)

381. Seminar in Personality. Advanced study of selected topics in personality theory and research. (Fall)

382. Seminar in Abnormal Psychology. Advanced study of the clinical descriptions and treatment of personality aberrations, with special emphasis on the etiology. (Spring)

383. Advanced Seminar in Behavioral Medicine. In-depth consideration of behavior/lifestyle factors in medical disorders, from etiological and treatment perspectives. Examples of selected topics are stress, social support, cardiovascular risk factors, diabetes, chronic pain, and cancer. (Spring)

PRACTICA

386. Seminar-Practicum in Community Mental Health and Prevention of Emotional Disorders I. Problems of early detection and prevention of emotional disorder, training new sources of mental health, manpower, and community mental health. (Fall)

387. Seminar-Practicum in Community Mental Health and Prevention of Emotional Disorders II. Continuation of PSY 386. (Spring)
SPECIAL COURSES
Each of the following courses may be offered as a Group II or Group III course with the approval of the instructor.

310. Honors Research I. Students select a faculty sponsor and develop a research proposal to be evaluated by the sponsor and honors coordinator for course credit. Pilot studies and collection of preliminary results are to be completed. To be taken no later than fall of the senior year. Prerequisite: PSY 309. (Fall)

311. Honors Research II. Students conduct research outlined in the proposal and prepare a research paper in standard form. Those receiving honors present their research at a mini-conference held at the end of the semester. Prerequisite: PSY 310. (Spring)

390. Supervised Teaching of Psychology. Teaching of topics in psychology within a regular course under an instructor's supervision.

391. Independent Study in Psychology. Supervised reading on topics not covered by existing courses, or on specialized topics.

392. Practicum in Psychology. Supervised reading and experience in an applied setting. Essential supervision by a University instructor only.

394. Internship in Psychology. Experience in an applied setting supervised on site. Approved and overseen by a University instructor. Limit: two internships in program.

396. Seminar on Special Topics. Consideration of recent experimental and theoretical contributions in several selected areas of psychology.

PUBLIC HEALTH

Charles E. Phelps, Ph.D. (Chicago) 
Professor and Chair of Community and Preventive Medicine, Professor of Political Science and of Economics

Theodore M. Brown, Ph.D. (Princeton) 
Professor of History and Associate Professor of Community and Preventive Medicine

Stephen J. Kunitz, M.D. (Rochester), Ph.D. (Yale) 
Professor of Community and Preventive Medicine

Alvin I. Mushlin, M.D. (Vanderbilt) 
Professor of Community and Preventive Medicine and of Medicine

Klaus J. Roghmann, Ph.D. (West Germany) 
Professor of Pediatrics, of Community and Preventive Medicine, and of Nursing

William H. Barker, M.D. (Johns Hopkins) 
Associate Professor of Community and Preventive Medicine

Deborah J. Ossip-Klein, Ph.D. (Pittsburgh) 
Associate Professor of Psychology and of Community and Preventive Medicine

Michael Weintraub, M.D. (Pennsylvania) 
Associate Professor of Community and Preventive Medicine, of Pharmacology, and of Medicine

James G. Zimner, M.D. (Yale) 
Associate Professor and Associate Chair of Community and Preventive Medicine and M.P.H. Program Director

Wayne M. Ledder, M.D. (George Washington), Ph.D. (North Carolina) 
Adjunct Associate Professor of Community and Preventive Medicine

John E. Vena, Ph.D. (SUNY, Buffalo) 
Adjunct Associate Professor

Elena M. Andreisen, Ph.D. (Washington) 
Assistant Professor of Community and Preventive Medicine

Karl D. Kieburz, M.D. (Rochester) 
Assistant Professor of Psychology and of Community and Preventive Medicine

Cleve L. Killingsworth, M.P.H. (Yale) 
Assistant Professor of Community and Preventive Medicine

*David H. Klein, M.B.A. (Chicago) 
Assistant Professor of Community and Preventive Medicine

Jonathan D. Klein, M.D. (New Jersey Medical School) 
Assistant Professor of Pediatrics and of Community and Preventive Medicine

Dana B. Mukamel, Ph.D. (Rochester) 
Assistant Professor of Community and Preventive Medicine

Sarah H. Trafton, J.D. (Suffolk) 
Assistant Professor of Community and Preventive Medicine

Jack Zwanziger, Ph.D. (Rand) 
Assistant Professor of Community and Preventive Medicine

Nancy M. Bennett, M.D. (New York University) 
Clinical Assistant Professor of Medicine and of Community and Preventive Medicine

*Nancy G. Hildreth, Ph.D. (Yale) 
Clinical Assistant Professor of Community and Preventive Medicine

Debra W. Graham, B.A. (Rochester) 
Associate Professor of Biology and of Community Preventive Medicine

The Department of Community and Preventive Medicine uses three to four teaching assistants in large lecture courses as graders or section leaders.

Although the Department of Community and Preventive Medicine in the School of Medicine and Dentistry does not offer an undergraduate degree, it does offer courses available to undergraduate students. Furthermore, a concentration in health and society (see page 86) may include courses from the department. In addition, the department offers a 3-2 program that allows students to earn a bachelor's degree in their undergraduate major and a Master of Public Health degree in five years. This program is designed to train future health professionals by developing and enhancing their planning, evaluative, research, and management skills. Graduates are prepared for roles in a wide variety of public and regulatory agencies, in profit and for-profit private health agencies, and in health services research. They frequently become agency administrators, research associates, planners, and program coordinators. Some also find academic and teaching positions.

*Part-time.
THE 3-2 OPTION
A limited number of undergraduates may complete the Master of Public Health under a 3-2 option. In this program, the first three years are devoted to the completion of most requirements for an undergraduate degree. During the fourth year, students in the 3-2 program begin coursework in the master's program by following the full-time first year of the master's program. In some instances, students may need to use these elective spaces in the fourth year to complete undergraduate requirements. The fifth year of the program is devoted to the completion of the M.P.H. elective course requirement (12 to 18 hours of graduate elective credits) and the completion of the master's essay (PM 460, equivalent to six to 12 credit hours). At the end of the fourth year students receive the bachelor's degree and at the end of the fifth year students receive the Master of Public Health degree from the School of Medicine and Dentistry. Students interested in the 3-2 option are advised to consult the Department of Community and Preventive Medicine's description of the M.P.H. in the Official Bulletin: Graduate Studies.

ADMISSION REQUIREMENTS
FOR THE 3-2 PROGRAM
Students wishing to apply to the 3-2 program must apply in the spring of their junior year. At that time, students should have satisfied the college basic writing, foreign language, and foundation requirements, taken some special health-related courses, and completed or nearly completed coursework in their major. Prospective students are strongly advised to complete at least one semester of college mathematics during their first three years. Applicants to the program will be allowed considerable latitude in meeting the health-related course expectations. Depending on prior or concurrent experience in the health field and on other individual factors, candidates may present one or more courses for consideration.

Applicants must submit the following information: (1) written application with essay, (2) at least two letters of recommendation, (3) official transcript, (4) Graduate Record Examination aptitude test scores, (5) a sample of written work (other than the application essay). Details of the required application materials are enclosed with the application. All information should be submitted by February 15. Interviews are part of the final selection process. In some cases, successful candidates are advised to pursue some sort of health-related employment or placement/tutorial experience during the summer after their admission to the 3-2 program.

Application materials and additional information may be obtained from Dr. James Zimmer, Program Director, Department of Community and Preventive Medicine, Box 644, University of Rochester Medical Center, 601 Elmwood Avenue, Rochester, New York 14642.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

116. Introduction to Community Medicine. Analysis of current issues in the organization, financing, and evaluation of personal and public health care. Same as CAS 116. Alternate years. (Fall)

392. Health Services Practicum. Introduces students to the organization and function of community agencies. Selected students are expected to spend six to seven hours per week at an agency site working on a project related to health care administration, planning, or evaluation. Same as CAS 392. (Fall)

415. Applied Epidemiology. Emphasizes epidemiology as an applied science in the study and solution of health and disease problems from the community point of view. Principles and techniques are taught through selected readings and problem-solving exercises focusing on data-gathering methods for defining health problems, design of analytic studies of the determinants of disease, and design of studies for describing and evaluating health services. Students are required to write a mock protocol for conducting an epidemiologic study. Several guest seminars are presented by health professionals who are employing epidemiology in local health agencies. Prerequisite: permission of instructor. (Fall)

416. Epidemiologic Methods. This course follows PM 415 and is designed to provide in-depth coverage of the quantitative and methodologic issues associated with population-based epidemiologic research. Issues specific to study design, conduct, and analysis are emphasized. Topics covered include: issues in study design, topics in measurement, sample size estimation, methods in environmental and occupational health research, confounding and effect-modification, and analytic techniques. Prerequisite: PM 415. (Spring)

420. Politics and Policies in the U.S. Health Care System. The seminar is designed to provide an understanding of the principal health institutions and their behavior. Readings are used to explore selected topics of importance for national health policy and local decision making. Contemporary health politics and policies are examined in terms of the influence of political and economic forces on the health care system and the historical development of health services in the United States. Prerequisite: permission of instructor. Same as PPA 420. (Fall)

422. Ethics and the Making of Public Policy. A systematic analysis of the ethical aspects of policy making in five substantive policy areas. Same as PPA 541. (Spring)

425. Health Economics, Management, and Organization I. This two-semester course sequence begins with the economics component that emphasizes the basic principles of demand for medical care and health insurance, supply of health care (including not-for-profit), hospital behavior, and their interaction in the market. Application of the concepts reinforce the conceptual ideas while providing relevance to current issues. The management part of the course allows students to develop an understanding of the major elements and concepts of executive-level management and leadership as applied to health and human service organizations. Concepts learned are applied to the review of the management and organization of a community human service agency. See also the second course in the sequence, PM 450. (Fall)

430. Medical Sociology. This course is designed to run in parallel with PM 420, though it can be taken independently as well. Topics covered are epidemiological studies of health problems that have been influential in the formation of health care policy. Most attention is given to studies in the United States, with less devoted to European and developing nations. Prerequisite: permission of instructor. Same as PPA 426. (Fall)

436. Health Policy. Analysis of factors that affect supply and demand in the market for medical care: risk, insurance, externalities, and regulation. Prerequisites: statistics and PPA 407. Same as PPA 436. (Spring)

440. Legal Issues in Health Care. Exposes the student to a broad array of the legal issues that arise in the context of health care. Topics covered include the legal basis for government involvement in health care, the rights of the patients and providers, including principles that have developed for the protection of specific patient groups including infants, children, and those who lack capacity, and the legal aspects of health care financing and regulation. (Fall)

445. Aging and Public Policy. The content, rationale, and proposals for reform of public programs for the elderly. Programs analyzed...
emphasize include: the evolution of environmental health from its roots in communicable diseases; current environmental health issues; epidemiology of occupational hazards and their relevance to public health; environmental health policy and regulation; and the prevention and control of environmental hazards. (Spring)

479. Health, Medicine, and Social Reform. Pursuit of the theme of public health and medical reform in leading writers committed, from different positions along the political spectrum, to the social and economic reorganization of modern society. Alternate years. Same as HIS 479. (Spring)

480. Changing Concepts of Health and Illness. Historical account of the way disease has been conceptually understood in the Western tradition. Emphasizes the scientific, epidemiological, philosophic, social, cultural, and professional forces that have shaped the development of ideas. Alternate years. Same as HIS 480. (Spring)

482. Clinical Evaluative Sciences. This course covers the types of study design and settings available for original observations about clinical interventions and practice patterns. It focuses on the use of patient populations and databases as laboratories for the generation of new knowledge and information. Ways to improve the outcome and efficiency of personal health services through evaluating their effectiveness, quality, appropriateness, and cost are explored. The material covered introduces the methods, databases, and settings available for such studies. (Fall)

483. Economics, Policy, and the Health Care System. A study of how insurers, hospitals, and physicians interact and how the nature of these interactions affects the system's overall economic performance. Prerequisites: microeconomic theory and a knowledge of the U.S. health care system. Same as PPA 483. (Spring)

484. Medical Decision and Cost Effectiveness. This course provides the tools necessary to understand the elements of medical decisions and a quantitative framework to analyze their implications. It also examines the types of data available to study clinical practices and provides examples of such investigations. Prerequisite: at least one semester of statistics. (Spring)

494. Special Topics in Preventive Medicine. Credit— to be arranged. Special studies and investigative projects can be arranged with individual members of the Department in the areas of medical care research, medical economics, medical sociology, medical administration, and epidemiology.

PUBLIC POLICY ANALYSIS

Randall Calvert, Ph.D. (California Institute of Technology) Professor of Political Science and Chair of the Department
David Austen-Smith, Ph.D. (Cambridge) Professor of Political Science
Jeffrey S. Banks, Ph.D. (California Institute of Technology) Professor of Political Science and of Economics
Eric A. Hanushek, Ph.D. (M.I.T.) Professor of Economics, of Political Science, and of Public Policy
Bruce Jacobs, Ph.D. (Harvard) Professor of Political Science and of Public Policy
Richard G. Niemi, Ph.D. (Michigan) Professor of Political Science
Walter Y. Oi, Ph.D. (Chicago) Milliman Professor of Economics
Charles E. Phelps, Ph.D. (Chicago) Associate Professor of Political Science
Lawrence S. Rotenberg, Ph.D. (Stanford) Associate Professor of Political Science and of Public Policy
Edward J. Bird, Ph.D. (Wisconsin) Associate Professor of Political Science and of Public Policy
Renée Smith, M.A. (Michigan) Instructor in Political Science
Carolyn Whitfield, M.S. (Rochester) Lecturer in Public Policy
Michael J. Wolko, Ph.D. (Michigan) Senior Lecturer in Public Policy and in Economics
Walter Broadnax, Ph.D. (Syracuse) Adjunct Professor of Political Science and of Public Policy

The Public Policy Analysis Program offers interdisciplinary training to individuals interested in analysis or leadership careers in the design, evaluation, and implementation of public policies. These careers may be in either government or related private companies. The program, which generally requires two years to complete, leads to an M.S. (public policy) degree. Students are encouraged to complete an internship in a government or related agency between the first and second year.
COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

403. Mathematical Modeling. An introduction to mathematical modeling in the social sciences, designed for students with limited math backgrounds. Develops concepts of calculus, matrix algebra, and set theory. Same as PSC 404, (Fall)

404. Introduction to Statistical Methods. Develops basic concepts of statistical theory for use in public policy analysis. Same as PSC 404, (Fall)

405. Multivariate Statistical Methods. Develops linear statistical models, with special emphasis on multiple regression techniques. Applications in public policy analysis and social science research. Same as PSC 405, (Spring)

406. Survey Design and Analysis. Introduces survey analysis concepts and methodology, including sampling, measurement, data preparation, and analytical methods. The interpretation of existing surveys is treated along with the development of new ones. Same as PSC 406, (Fall*).

407. Microeconomic Theory. Develops basic microeconomic concepts, including supply and demand relationships, market equilibrium, welfare analysis, and uncertainty. Attention is given to the conceptual framework for making decisions about the allocation of resources. ECO 207 may be an acceptable substitute with permission of the Program Director. (Fall)

420. Introduction to Politics and Policy in the U.S. Health Care System. The seminar is designed to provide an understanding of the principal health institutions and their behavior. Contemporary health policies and policy are examined in terms of the influence of political and economic forces on the U.S. health care system. Same as PM 420. (Fall)

425. Management of Human Services. This course is about the management of agencies, institutions, and firms that deliver human services and that are broadly classified as health care, education, welfare, etc. Emphasis is placed on health care organizations. Same as PM 425. (Spring)

426. Medical Sociology. This course is designed to run parallel with PPA 420, though it can be taken independently. Topics include epidemiological studies of health care problems that have been influential in the formation of health care policy. Same as PM 430. (Fall)

430. Public Policy Methods. Considers rationales and limits to public policy and survey techniques commonly used in policy analysis such as benefit-cost analysis and program evaluation. (Fall)

431. Public Policy Workshop I. Involves students in the formulation and conduct of policy analyses for actual "clients." Under the guidance and monitoring of a faculty member, students work directly with agency officials in developing analyses of real-world problems. In the process, they become familiar with the constraints and pressures that exist and learn to cope with the environment often faced in policy analysis jobs. (Spring)

432. Public Policy Workshop II. Follows PPA 431 and emphasizes in-depth analysis of a particular policy problem. Through this course and its companion PPA 452 (spring), students develop a comprehensive essay studying a policy issue of their own choosing. (Fall)

433. Public Policy Modeling. Considers the application of microeconomic theory and organizational analysis to public policy problems. Conceptual ideas are illustrated in a variety of diverse areas, such as environmental quality, welfare reform, health insurance, and educational finance. Same as ECO 433. (Spring)

435. Organizational Theory and Behavior. An analysis of individual and collective behavior in public and private organizations. Various explanations of bureaucratic decision making and performance are considered. (Spring)

M.S. IN PUBLIC POLICY AND MASTER OF PUBLIC HEALTH

Through a cooperative arrangement between the Public Policy Analysis Program and the Department of Community and Preventive Medicine, students may undertake a combined three-year program leading to the degrees M.S. in public policy and Master of Public Health. For this program, the existing M.S. degree program in public policy analysis requires that elevees in the policy area be taken in the Department of Community and Preventive Medicine. Conversely, the elective credits for the Master of Public Health degree must be concentrated in public policy courses.

*PPA 406 is taught Sept-Oct and PPA 460 Oct-Dec. Each course is 2 credit hours.
436. Health Policy. Analysis of factors that affect supply and demand in the market for medical care: risk, insurance, externalities, and health care cost control. Same as ECO 236, (Spring)

437. Domestic Social Policy. The content, rationale, assumptions, and development of selected domestic policies. The use of social science theories and findings in policy formation and evaluation. Same as PSC 237. (Fall)

438. Natural Resource Economics. Deals with theories of exhaustible resources, regulatory policy, and industrial organization as related to energy markets, particularly oil and natural gas. Same as ECO 238. (Fall)

439. Family Policy in the United States. General framework for analyzing family policy and its history in the United States as well as specific policy areas such as child care, foster care, and adolescent pregnancy. Same as PSC 239. (Fall)

440. Economic and Public Policy. Analyzes policies in such areas as social security, public assistance, health care, and social services for the elderly. Same as PSC 240. (Spring)

441. Economics of Education. Costs and returns to investment in education; public policy decisions about education; educational finance. Same as ECO 239. (Spring)

442. Risk and Insurance. Applied theories of risk and insurance to issues of public policy. Same as ECO 240. (Spring)

443. Public Policy Workshop III. Continuation of PPA 432. (Spring)

444. Public Management. The theme of this course is one of developing the capacity to manage public organizations. Various dimensions of managing in the public sector will be examined. (Fall)


446. Local and State Public Finance. Analysis of state and local governmental tax and expenditure policy and their respective roles in the federal system. Same as ECO 261. (Spring)

447. Finance. Government tax and expenditure policies and their effect on resource allocation and income distribution. Same as ECO 262. (Fall)

448. Urban Economics: Prospects for Metropolitan America. Examines conditions of urban America with emphasis on issues that are of particular importance to policy makers. Prerequisite: ECO 207 or PPA 407. Same as ECO 264. (Spring)

**RELIGION AND CLASSICS**

Joseph P. Brennan, S.S.L. (Pontifical Biblical Institute, Rome) Professor of Religion and Director of University Religious Affairs

Karen E. Fields, Ph.D. (Brandeis) Professor of Religion

William Scott Green, Ph.D. (Brown) Professor of Religion and Philip S. Bernstein Professor of Judaic Studies and Director, Center for Judaic Studies

Grace Harris, Ph.D. (Cambridge) Professor of Anthropology and of Religion

Alfred Geier, Ph.D. (Johns Hopkins) Associate Professor of Classics

Edward Wierenga, Ph.D. (Massachusetts) Associate Professor of Religion and Chair of the Department

Kathryn Argetsinger, Ph.D. (Princeton) Assistant Professor of Classics

Douglas R. Brooks, Ph.D. (Harvard) Assistant Professor of Religion and Chair of Committee on Asian Studies

*Emil Homein, Ph.D. (Chicago) Assistant Professor of Religion

Deborah Lyons, Ph.D. (Princeton) Assistant Professor of Classics

Daniel Beaumont, Ph.D. (Princeton) Visiting Assistant Professor of Arabic Language and Literature

Ruth Kessler, M.A. (Arizona) Senior Lecturer in Hebrew

Harmon R. Holcomb, B.D. (Colgate Rochester) Professor Emeritus of Philosophy and of Religion

Abraham J. Karp, M.H.L. (Jewish Theological Seminary) Professor Emeritus of History and of Religion and Philip S. Bernstein Professor Emeritus of Jewish Studies

In the Department of Religion and Classics students explore the great, classical civilizations of West and East and the major religions that emerged from them. The Department offers programs of study in the history and philosophy of the world's major religions, in Greek, Latin, Hebrew, and Arabic languages and literatures, and in ancient Mediterranean and Oriental civilizations. Through the study of important classical, biblical, and religious writings, either in the original language or in translation, students critically examine the beliefs, ideas, values, rituals, and traditions that have shaped Western and Oriental cultures and study the ways these have persisted and changed from ancient to contemporary times.

**REQUIREMENTS FOR CONCENTRATION IN RELIGION**

The goal of a concentration in religion is to achieve an understanding of the nature of diverse religions, the methods employed in their study, and a measure of competence within a specific tradition or area. Seminars, reading courses, and the senior tutorial allow intensive study of particular topics. Students also may enroll in selected courses at Colgate Rochester Divinity School/Bexley Hall/Crozer Theological Seminary and take advantage of its distinguished theological library.

A minimum of 10 courses is required:

1. Either REL 101 or 102.

2. One course in the history of a tradition, either REL 103, 104, 105, 106, or 107.

3. REL 293, normally taken in the junior year.

4. Six other courses, no more than three of which may focus on the same religious tradition.

5. Senior Tutorial (REL 393), as directed, individual study project or Senior Seminar (REL 389).

**HONORS IN RELIGION**

1. Eight credits of honors coursework with a grade of at least B+ selected from the following honors courses:

   • REL 293. Theories of Religion
   • REL 389. Senior Seminar
   • REL 390. Supervised Teaching
   • REL 392. Honors Research. Independent study taken as preparation for writing the senior thesis.

2. REL 293. Senior Thesis

3. A successful oral defense of the thesis.

**MINOR IN RELIGION**

1. Either REL 101 or 102.

2. One course in the history of a religious tradition, either REL 103, 104, 105, 106, or 107.

3. REL 293.

4. Three other courses in religion, selected in consultation with the student's advisor in the Department.

A concentration in religion may include no more than three 100-level courses.

**REQUIREMENTS FOR CONCENTRATION IN CLASSICS**

The concentration in classics is language-centered. Coursework in Greek and Latin is supplemented by studies in ancient literature, religion, philosophy, history, and art. The goal of the concentration is to be able to analyze and interpret significant texts in the ancient languages and to understand their cultural context. Students may choose a concentration in classics (both languages), or in Greek or Latin alone; all majors, however, are encouraged to take at least one year of each language, if possible.

*PPA 406 is taught Sept.-Oct. and PPA 460 Oct.-Dec. Each course is 2 credit hours.

*Has applied for one or two semesters of leave in 1993-94.
A minimum of 11 courses is required:
1. At least eight courses in Greek or Latin numbered 103 or above, with a minimum of two in either language.
2. Three courses in Classical Studies, or related field with permission of departmental advisor.

Greek or Latin
A minimum of 10 courses is required:
1. At least six courses in the major language numbered 103 or above.
2. Four courses in Classical Studies, or related field with permission of departmental advisor.

MINOR IN LATIN
1. LAT 101 and 102, or the equivalent.
2. Four courses of close textual analysis and interpretation, chosen from a wide range of Latin authors, and read in the original language.

MINOR IN GREEK
1. CGR 101 and 102, or the equivalent.
2. Four courses of close textual analysis and interpretation, chosen from a wide range of Greek authors, and read in the original language.

MINOR IN CLASSICAL CIVILIZATION
Six courses are required, of which at least two must be 200-level or above.
1. Two courses in a classical language, either both in Latin or both in Classical Greek, or the equivalent, e.g., completion of the language proficiency requirement in either of these languages.
2. Four courses in classics, or related field with the permission of the departmental advisor.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

RELIGION
101. Old Testament. The historical formation of the Old Testament; a study of its representative books; discussion of their significance then and now. (Spring)
102. Introduction to the New Testament. A survey of all the New Testament writings in their historical and cultural context, with emphasis on the theological themes expressed by that literature. (Fall)
103. History of Judaism. The basic elements of Judaism and their transformations and developments in Biblical, rabbinic, and modern periods. Same as HIS 121.
104. History of Christianity. A study of the development of Christian belief and thought about God, Jesus, scripture, ethics, and the church. (Spring)
105. The Asian Search for Self. A study of the basic teachings of Hinduism and Buddhism as to the nature of man, and the paths to liberation. Same as HIS 105. (Fall)
106. From Confucius to Zen. The teachings, practices, and social impact of the major religious traditions of China and Japan. Same as HIS 106. (Spring)
107. History of Islam. This course traces the development of the religion of Islam from its origins in the Qur'an and Muhammad's teachings, through the codification of the Classical tradition in its various forms, and, finally, to the living Islam of the contemporary world. Same as HIS 107.
108. Greek History and Civilization. Same as HIS 110, CLA 110. (Fall)
111. Philosophy of Religion. Historical and recent readings are used to analyze issues such as: existence of God, divine attributes, the relation of God to the world, and faith and reason. Same as PHL 111. (Fall)
110. Classical and Scriptural Backgrounds to Western Culture. The great tradition, from Homer, Greek drama, Plato, and Virgil to the Bible and Dante. Same as ENG 140, CLA 140, and LIT 140. (Fall and Spring)
201. Early Christian and Byzantine Art. Same as AH 211.
205. Romanesque Art and Architecture. Same as AH 214. (Spring)
207. English Art. Same as AH 215.
208. Chaucer. Same as ENG 206.
214. Religions: Their Values and Symbols. Same as ANT 263. (Fall)
216. Plato and Logopoeisis. Same as CLA 216, LIT 216. (Spring)
217. The Arts of Buddhist Asia. Same as AH 220. (Fall)
218. The Holocaust. A historical, theological, and ideological analysis of the Holocaust—the ghettos, death camps, and resistance. Same as HIS/JST 218. (Spring)
220. Healing and Ritual. Same as ANT 220.
221. Literature and Society in Ancient Rome. Same as CLA 221, HIS 259. (Fall)
224. Augustine, Anselm, and Aquinas. Three formative philosophical treatments of religious belief are compared on selected topics such as freedom, providence, and the problem of evil. Same as PHL 246/446.
225. Ethical Decisions in Medicine. Examination of a select number of moral issues arising in medicine. Topics include abortion, termination of life, experimentation on human subjects, informed consent, refusal of treatment, and suspension of treatment. Same as PHL 225/425. (Spring)
226. Contemporary Issues in Philosophical Theology. A philosophical examination of such theological concepts as original sin, atonement, incarnation, and trinity. (Spring)
233. The Problem of Evil in the Hebrew Bible. A study of key texts from the Hebrew Bible which seek to explain the presence of evil in the world. (Fall)
254. Buddhism: The Compassionate Teachings of the Middle Way. An introduction to the concepts, values, and practice of Buddhist tradition as it spread from its Indian origins into Tibet, Southeast Asia, and East Asia. Study focuses on Buddhism as a total cultural phenomenon.
236. Judaism and Christianity. A historical, topical, and analytical study of the Jewish and Christian religious traditions—where they converge and where they depart; what they share and how they differ. Same as HIS 239.
259. Catholicism in American Life. A study of the development of Catholicism from a broadly cultural perspective: political, social, economic, artistic, philosophical, and theological elements will be considered of American Catholicism's story. Same as HIS 239. (Spring)
242. Dharma: The Hindu Way of Life. A historical study of the ideas, values, and practices that have shaped Indian civilization from the Vedic period to modern times.
244. Myth and Ritual in Epic Hinduism. A close examination of the Mahabharata and scholarship pertaining to Indo-European mythology. (Spring)
245. Religion in Ancient Meso-America. Same as ANT 245.
246. Cry Freedom: Liberation Theologies in Africa and the Americas. The course examines various theologies of liberation including writers from South Africa, Latin America, and men and women from North America. Same as AAS 246. (Spring)
250. Greek Religion. An introduction to the religion of ancient Greece through the study of classical texts in English translation. Same as CLA 250.
254. The Buddha Legend and Buddhist Philosophy. A close examination of the legend of the Buddha and the concept of buddhahood as it is presented in the Pali and Sanskrit canons and in the works of several influential Indian and Tibetan philosophers. (Fall)

255. Seminar in Zen Buddhism. A focused examination of the intellectual and historical origins of Zen Buddhism, including works from Basho, Dogen, and Nishitani.


262. Politics, Rebellion, and Religion. The struggle between state and empire in Judaism and Christianity, 165 B.C.E. to 212 C.E. Same as HIS 257. (Fall)

264. Modern Jewish Thought. Jewish thought as response to major intellectual changes faced by Jews since 1700. Four philosophies will be considered: Hasidism as response to religious persecution and formalism, Haskalah as response to Western Enlightenment, Reform Judaism as response to emancipation, and Zionism. Same as HIS 264 and JST 264.

266. South East Asian Ideologies. Same as ANT 240.

267. Pagans and Christians. Religious change and continuity in the first four centuries C.E. The "conversion" of the Roman Empire is studied through close reading of primary sources and analysis of modern interpretations. Same as CLA 267.

269. Tolstoy and Dostoevsky. Same as LIT 269. (Spring)

274. Islamic Mysticism. An advanced introduction to mystical life in Islam which studies mystical experience and theory and traces the importance of Islamic mysticism to religion, philosophy, art, and literature as found in medieval and modern Muslim societies.

275. Roots of the Middle East Crisis. See HIS 249.

276. Mysticism. This course introduces and examines mystical experience and the quests for it. Ancient and modern views of the subject will be considered as well as mysticism's impact on religion, art, and society.

277. The Qur'an. The course studies the prophet Muhammad, the Qur'an, and their importance to medieval and modern Muslim culture. The prophet's life and major themes of the Qur'an will be discussed together with interpretations of them found in Islamic legal, theological, philosophical, and mystical writings.

278. Islam and the Third World. This course studies some of the important and often dramatic changes occurring in modern Islam by examining the effects on it of Third World political, social, and economic factors. Same as AAS 278, HIS 278. (Spring)

279. Qur'anic Arabic. Study of the Arabic of the Qur'an—its vocabulary, grammar, and syntax. All primary readings in Arabic and drawn from the Qur'an. Completion of ARA 102 or equivalent is a prerequisite; previous or concurrent enrollment in REL 277 is highly recommended though not required. Same as ARA 279.

280. The Idea of the Messiah. Traces the development of this idea from Israelite religion and Judaism through its manifestations in the West in Medieval and modern times. (Fall)


282. Modern Egyptian Fiction in Translation. Samples some of the vibrant array of contemporary Egyptian short stories and novels that have been translated into English from their original Arabic. Same as ARA 282 and LIT 282.


293. Theories of Religion. An investigation of important methodological contributions to the critical study of religion. (Spring)

299. Byzantine Orthodoxy. Same as HIS 309.

311. Byzantine Civilization. An introduction to the techniques of research in the Byzantine area for the non-specialist and the prospective specialist. Same as HIS 411. (Spring)

389. Senior Seminar. Topics, methods, and theoretical models in the study of religion. Restricted to senior religion majors.

391. Independent Study. By arrangement with the chair and with the consent of an instructor, to permit work beyond the regular course offerings. Limited to juniors and seniors with background in the selected area of reading.

393. Senior Tutorial. A directed, individual study project required of all senior concentrators.

ARABIC

101. Elementary Arabic I. An introduction to Modern Standard Arabic including the alphabet, pronunciation, vocabulary, grammar, elementary conversation, and reading. (Fall)

102. Elementary Arabic II. Continuation of ARA 101. (Spring)

103. Intermediate Arabic I. Graded readings in modern standard Arabic accompanied by a variety of other audio-visual materials and written drills.

104. Intermediate Arabic II. A continuation of ARA 103 with special attention to individual students in speaking, listening, writing, and reading Arabic.

279. Qur'anic Arabic. Same as REL 279.


GREEK

NOTE: Greek 101 and 102, or the equivalent, are prerequisites to all Greek courses at the 200 level.

101. Classical Greek I. An introduction to Greek designed to prepare students to read the Classical Greek dramatists, philosophers, orators, and historians, and the New Testament. (Fall)

102. Classical Greek II. Continuation of GRK 101. (Spring)


104. Intermediate Greek II. Continuation of CGR 103. Readings in an unadapted poetic text or drama.

204. Homer's Odyssey. Selections from the Odyssey of Homer read in Greek. The entire Odyssey read in English and discussed.

206. Plato's Phaedrus. Study of the language and thought of the Phaedrus. (Spring)

209. Herodotus. Selections from Herodotus, the "Father of History" are read in Greek, and the entire Histories are read and discussed in English.

216. Sophocles' Ajax. A study of Sophocles' Ajax in Greek, its form, poetry, and meaning.

391. Independent Study. A study of special literary problems, under the direction of a member of the faculty.

393. Senior Essay. A paper based upon independent study; may be written by concentrators. Students should normally register for this course in the fall term of their senior year.

HEBREW

101. Elementary Hebrew I. Introduction to the structure of Hebrew. Practice in vocabulary, use, reading, and comprehension. Same as JST 101. (Fall)

102. Elementary Hebrew II. Direct continuation of Elementary Hebrew I with emphasis on enhancing reading, writing, and speaking skills. Same as JST 103. (Spring)

103. Intermediate Hebrew. Continuation of HEB 103 with emphasis on enhancing reading comprehension and writing skills. Students are expected to have good understanding of the structure of Hebrew including familiarity with verb forms. Same as JST 104. (Fall)

204. Hebrew through Conversation. A conversational course designed to increase oral proficiency in Hebrew. Classes will focus on topic-oriented discussions as well as enactment of real-life situations. Same as JST 204. (Spring)
LATIN
101. Elementary Latin I. An introduction to the Latin language based on the ancient authors and designed to prepare students for the reading of classical and medieval texts. (Fall)

102. Elementary Latin II. Continuation of LAT 101. Prerequisite: LAT 101 or permission of instructor. (Spring)

103. Intermediate Latin. Continuation of LAT 102. Completion fulfills the language requirement. Prerequisite: LAT 102 or permission of instructor. (Fall)

204. Latin Lyric: Catullus and Horace. A close study of the two principal Latin lyricists, emphasizing translation, interpretation, and metrics. (Spring)

205. Roman Love Elegy. Selections from the love poems of Propertius, Tibullus, and Ovid. Relevant historical and cultural material is used. (Fall)

206. Virgil’s Aeneid. A study of Books 1, 2, 4, 6 of Virgil’s Aeneid, concentrating on translation and interpretation of the work and improving linguistic and critical skills. (Spring)

207. Lucretius. Selections from Lucretius. Prerequisite: Completion of the proficiency requirement, or permission of the instructor. (Spring)

209. Seneca. Selections from Seneca’s dramatic and philosophical writings. (Fall)

210. Cicero. Study of a major oratorical work plus a sampling of the philosophy and letters. Prerequisite: LAT 201 or consent of instructor. (Spring)

221. Medieval Latin. Introduction to a variety of Medieval Latin texts chosen for historical and linguistic interest. Students complete independent studies of an author or topic of their choice. (Fall)

291. Independent Study. Advanced readings in unadapted Latin texts, by arrangement with the instructor. (Spring)

393. Senior Project. (Spring)

YIDDISH
101. Introductory Yiddish. Yiddish as it was spoken and written by the majority of Jewish Central European immigrants. Same as JST 100.

102. Intermediate Yiddish. Continues the work of the beginning course. There is added emphasis on reading comprehension and vocabulary building. Same as JST 102.

240. Yiddish. Yiddish as it was spoken and written by the majority of Jewish Central European immigrants.

CLASSICAL STUDIES
140. Classical and Scriptural Backgrounds to Western Culture. The Greek tradition, from Homer, Greek drama, Plato, and Virgil to the Bible and Dante. Same as REL 140, ENG 140, LIT 140. (Fall and Spring)

210. Classical Mythology. Introduction to the major myths of the Greek gods and heroes using readings in translation and slides of Greek art. (Fall)

215. The Homeric Hero. A close study of the Iliad and Odyssey, and a comparison of the two chief Homeric heroes, Achilles and Odysseus, and their re-evaluation in Virgil’s Aeneid.

216. Plato and Logopoiesis. A study of several Platonic dialogues (Phaedrus, Lysis, Symposium) and their themes, especially the relation of eros and speech to divinity. Same as LIT 228.

221. Literature and Society in Ancient Rome. Life at the turn of the millennium. Readings mostly in primary sources (in English). Literature, religion, and society at the height of Rome’s power.

250. Greek Religion. An introduction to the religion of ancient Greece through the study of classical texts in translation. Same as REL 250.

267. Pagans and Christians. Religious change and continuity in the first four centuries CE. The “conversion” of the Roman Empire is studied through close reading of primary sources and analysis of modern interpretations. Same as REL 267.

273. Sexuality and Gender in Classical Antiquity. Issues of sexuality and gender in ancient Greece and Rome. Readings (in English) include classical texts and modern theory. Same as WST 273.

287. Greek History and Civilization. Same as HIS 287.

RUSSIAN STUDIES

COMMITTEE ON RUSSIAN STUDIES
Brenda Meehan, Ph.D. (Rochester) Professor of History and Chair of the Program
Kathleen Parthé, Ph.D. (Cornell) Associate Professor of Russian
Jeffrey P. Burds, Ph.D. (Yale) Assistant Professor of History
Stephen Hutchings, Ph.D. (Durham, U.K.) Assistant Professor of Russian

The Russian Studies Certificate Program allows students concentrating in the social sciences and the humanities to broaden their knowledge of Russian language and culture. It serves as a complement to their disciplinary concentration. Upon graduation, the student receives a Certificate in Russian Studies as well as a B.A. in his or her department of concentration. Those selecting this program, in addition to fulfilling the requirements of their department, must meet the following requirements:

• A reading knowledge of Russian, to be demonstrated by completing RUS 105 or the equivalent.

• Satisfactory achievement in two of the following courses:
  RUS/LIT/HIS 128 or RUS 129
  RUS/LIT 261, 263, 264, 265, or 269

• Satisfactory achievement in HIS 129 and in one of the following courses:
  HIS 229 or RUS/LIT/HIS 128

• Satisfactory achievement in a course in Soviet politics or Soviet foreign policy, when given, or a combination of HIS 229 and either PSC 262 or 270. Note that RUS/LIT/HIS 128 can be used only once to satisfy the requirements of this program.

The Russian Studies Certificate Program is administered through the College Center for Academic Support. Students who plan to enroll in the program should pick up an application in the Center Office in 312 Latimer Hall and should also consult the Chair of the Program. Students should enroll in the program by November 10 of their junior year.
SOCIOLOGY

Dean Harper, Ph.D. (Columbia)
Professor of Sociology and of Psychiatry
Thomas Spence Smith, Ph.D. (Chicago)
Associate Professor of Sociology
Raymond Murphy, Ph.D. (Northwestern)
Professor Emeritus of Sociology and Senior Faculty Associate

Though the College offers a dozen or more courses in sociology each year, there is no Department of Sociology, and therefore no major, or minor, in sociology. Students of social science who are particularly interested in sociology, and do not wish to major in one of the departmental programs in the College, are encouraged to arrange an interdisciplinary major through the College Center for Study Abroad and Interdepartmental Programs (see page 93). Through the Center a program including an emphasis on sociology may be submitted for the approval of the Committee on Individualized Interdepartmental Concentrations. Students who plan on graduate study in sociology should consult one or more of the professors of sociology for advice concerning appropriate undergraduate courses, both in sociology and in other departments.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

INTRODUCTORY COURSES


SOCIOLOGICAL THEORY

201. Major Social Theories. An examination of the growth of major theoretical traditions in sociology. Students read from classic writings of Marx, Durkheim, Weber, Simmel, and others as background for understanding contemporary theoretical developments in such perspectives as structuralism, social exchange, conflict theory and functionalism.


METHODS OF RESEARCH

211. Design of Social Research. Some basic ideas from the philosophy of science applied to sociological investigation. The experiment as the model for sociological research. Necessary alterations in the experimental model. The logic of inference. Prerequisite: one course in statistics.

213. Social Research Methods. Field research; participant-observer research; survey research. The role of theory in social research. Design of investigations. Collection and analysis of data.

SPECIALIZED COURSES

221. Love, Friendship, and Community. Sociological study of personal ties and face-to-face social groups: kinship networks, friendship groups, political and religious ideological groups, intellectual circles.

222. Class, Status, and Power. Major theories and empirical studies of stratification in historical and contemporary settings; class structure.

231. Race Relations. Intergroup relations in industrial society, with special attention to black-white relations in America.

233. Deviant Behavior. The theoretical and empirical analysis of deviance as the product of societal reactions, official labeling activities, and other variables.


SEMINARS AND READING AND RESEARCH COURSES

312. Studies in Medical Sociology. An intensive analysis of two or three sociological concepts or theories and their use in the study of health, diseases, and medicine. Prerequisite: permission of instructor.

391. Independent Study in Sociology. Special work individually assigned, with the consent of the Department.

392. Directed Research. Individual research projects, done under the supervision of a faculty member.

394. Internship.

STATISTICS

K. Ruben Gabriel, Ph.D. (Hebrew University) Professor of Statistics
William Jackson Hall, Ph.D. (North Carolina) Professor of Statistics and of Biostatistics
Govind Shrikirshna Mudholkar, Ph.D. (North Carolina) Professor of Statistics and of Biostatistics

David Oakes, Ph.D. (London) Professor of Statistics and of Biostatistics and Chair of the Department
Poduri S.R.S. Rao, Ph.D. (Harvard) Professor of Statistics, of Biostatistics, and in the William E. Simon Graduate School of Business Administration
Martin A. Tanner, Ph.D. (Chicago) Professor of Biostatistics, of Statistics, and of the Department of Biostatistics
Richard F. Raubertas, Ph.D. (Wisconsin, Madison) Associate Professor of Biostatistics, of Statistics, and of Oncology
Michael P. McDermott, Ph.D. (Rochester) Assistant Professor of Biostatistics, of Statistics, and of Neurology

Julian Keilson, Ph.D. (Harvard) Professor Emeritus in the William E. Simon Graduate School of Business Administration and of Biostatistics

The Department employed 10 to 15 teaching assistants as graders or section leaders.

The Department of Statistics offers instruction in statistics from introductory through graduate levels. Programs leading to the B.A., M.A., and Ph.D. degrees in statistics and joint B.A. and M.A. programs in mathematics and statistics are available. The Department interprets the term "statistics" very broadly. The courses available permit specialization in statistical theory, probability theory, statistical analysis, biostatistics, medical statistics, and operations research. The Department recognizes and emphasizes both theoretical and applied aspects of statistics. Some computer usage is an essential and integral part of all programs. By appropriate choice of courses, students may coordinate their statistical education with some specific field of application. Or, they may choose a program strong in theory and in supporting mathematics courses.

*Has applied for one or two semesters of leave in 1993-94
Opportunities for student participation in statistical consulting projects are sometimes available through the affiliated Department of Biostatistics in the School of Medicine and Dentistry.

The objectives of the B.A. program are to provide (1) a background in quantitative methods for graduate work in the social sciences or business administration, (2) training in statistical methods for work in government or industry, and (3) an introduction to statistics in preparation for graduate work in statistics and related fields.

INTRODUCTORY COURSE INFORMATION
The Department offers five introductory courses. Two of the courses (165 and 201/203) are theoretical in nature; the others (143, 211, 212) are applied. STT 165 is an introductory course in probability and statistical theory; it provides a background in theoretical and applied statistics as used in the sciences and economics. STT 201/203 is a two-semester, thorough introduction to the theory of probability and statistics. (Students should not take both 165 and 201/203.)

STT 145 is a nonmathematical, introductory, terminal course concentrating on interpretation of data and on some of the basic techniques of statistical analysis along with computer implementation. STT 211 and STT 212 are more technical, though still without any mathematical prerequisite; many of the techniques of statistical analysis are introduced along with computer implementation. Either of these may be followed by STT 216, which further develops techniques of statistical analysis.

STT 201, 203, 211, 216; and 212, 216 are natural two-course sequences for statistics as an allied field. Other two-, three-, and four-course sequences are possible.

CONCENTRATION IN STATISTICS
The concentration in statistics must form a coherent program directed toward the objectives of the student, and must be approved by the statistics departmental advisor. It is recommended that if possible, students considering statistics as a concentration take STT 211 or 212 and one other statistics course, or STT 201/203 during their sophomore year. At least one course involving computer usage or familiarity with some standard software package is required.

REQUIREMENTS FOR STATISTICS MAJORS
- MTH 161-162 or their equivalents (141-143 or 150-152), and 163-164.
- 10 additional courses:
  a. Six to eight statistics courses, including 201, 203, 211 or 212, 226.
  b. Two to four courses in an allied field: computer science, mathematics, economics, engineering, political science, psychology, sociology, management, or any cognate field, with the consent of the Department.

SOME OF THE 400-LEVEL COURSES IN STATISTICS (see the Official Bulletin: Graduate Studies) are also available to concentrators.

DOUBLE MAJORS
The above requirements are needed for double concentrations—statistics and another field, e.g., economics, mathematics, political science, psychology—in addition to the requirements in the other field; the departmental advisor should be consulted.

JOINT CONCENTRATION IN MATHEMATICS AND STATISTICS
MTH 161–164 plus MTH 201, 202, 203, and 207 or 208; MTH 236, 265; STT 226; CSC 100; two additional 200-level courses in mathematics and/or statistics. Approvals of the advisors from both the departments are required.

REQUIREMENTS FOR A MINOR IN STATISTICS
A total of five courses is required:
1. STT 201 (prerequisite: MTH 143, 152 or 162).
2. STT 203 (prerequisite: STT 201).
3. STT 211 or 212.
4. At least one of the following:
   STT 216 (prerequisite: STT 211 or STT 212).
   STT 226 (prerequisite: STT 203).
5. At least one elective from the offerings of the Department and/or computing (e.g., CSC 171). The choice of elective(s) will be made with the advice/approval of the statistics department advisor for undergraduates.

THE 3-2 PROGRAM IN MEDICAL STATISTICS
With the approval of the advisor, some of the courses for the statistics concentration can be used for this program. Students majoring in statistics can expect to complete the requirements of the M.S. program in a single additional year of study.

Statistical studies in medicine, pharmaceuticals, public health, and related fields have been increasing in recent years with the expansion of medical care and federal monitoring of new drugs and treatments. This has generated a demand for professional statisticians able to design and analyze such studies. The Program in Medical Statistics attempts to meet this demand. It provides a grounding in probability, statistical theory, and computing and then introduces students to the problems met in medical and pharmaceutical studies and the methods of dealing with their design, analysis, and interpretation. Students will obtain hands-on experience with statistical work either in industry or in university research.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

165. Elements of Probability and Mathematical Statistics. Probability, probability distributions, random variables, moments, principles of statistical inference, estimation, hypothesis testing. Prerequisite: MTH 141, 150, or 161.
201. Introduction to Probability. Probability spaces, combinatorial problems, random variables and expectations, discrete and continuous distributions, generating functions, independence and dependence, binomial, normal, and Poisson laws, laws of large numbers. Prerequisite: MTH 143, 152, or 162. Same as MTH 201.


203. Introduction to Mathematical Statistics. Principles of statistical decision theory, point and interval estimation, tests of hypotheses, multivariate normal distribution, linear hypotheses, selected topics. Prerequisite: STT 201. Same as MTH 203.


211. Applied Statistics for the Social Sciences I. Descriptive statistics, statistical analysis, and statistical inference as used in the social sciences; including elements of correlation, regression, and analysis of variance. Computer usage.

212. Applied Statistics for the Biological and Physical Sciences I. Descriptive statistics, statistical analysis, and statistical inference as used in the biological and physical sciences; including elements of correlation, regression, and analysis of variance. Computer usage.

216. Applied Statistics II. Continuation of 211 or 212. Analysis of variance, regression, correlation contingency table analysis, and associated topics. Prerequisite: STT 211 or 212.


222. Design of Experiments. Randomized blocks and Latin squares, one- and two-way classifications, factorial experiments, analysis of variance and covariance, t-tests and F-tests.


277. Computing: Introduction to Statistical Software. Introduction to the MINITAB, SAS, and S programming environments. Some general theoretical and practical topics in computing also presented. Individual projects on some advanced topics. Prerequisite: STT 212 and either STT 216 or STT 226. (Course offered first half of semester.)

280. Introduction to Numerical Analysis. Same as MTH 280 and CSC 280.
Gary D. Paige, M.D. (Chicago)  
Associate Professor of Neurology, of Physiology, of Ophthalmology, and of Otolaryngology and in the Center for Visual Science

Tatiana Pasternak, Ph.D. (Copenhagen)  
Associate Professor of Neurobiology and Anatomy, and of Psychology, * and in the Center for Visual Science

Robert C. Emerson, Ph.D. (Pennsylvania)  
Senior Scientist of Ophthalmology, Associate Professor* of Psychology, and in the Center for Visual Science

Inger Williams, Ph.D. (Penn State)  
Adjunct Assistant Professor in the Center for Visual Science

Joanne E. Albano, Ph.D. (Duke)  
Research Associate in the Center for Visual Science

Teaching assistants occasionally assist instructors in the courses offered in the Center, primarily in large courses or those requiring laboratories or numerous demonstrations.

The Center for Visual Science (CVS) is located on the River Campus in Meliora Hall. Its primary purpose is to provide specialized coursework and advanced research facilities for students and postdoctoral workers in various disciplines whose work or interest involves the field of visual science. This is done with the cooperation of faculty who have their primary appointments elsewhere in the University. Prospective students with an interest in this area typically come from any one of the following departments: computer science, neurobiology and anatomy, ophthalmology, optics, physiology, or psychology. CVS courses are available to students working toward degrees in any of the regular departments of the University. Undergraduate students can participate in research and graduate courses with special approval.

**COURSES OF INSTRUCTION**

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

**151. Sensation and Perception**  
Introduction to the fundamental facts, methods, and theories about sensing stimulation, processing information, and perceiving objects in the environment. Psychophysical and physiological aspects of vision, audition, taste, smell, and the skin senses are included. Same as PSY 151. (Fall)

**255. Sensory Systems**  
A large part of the brain is concerned with the analysis of information that impinges on the sense organs. This course deals with the operation of the sense organs—the principles of their operation and how their design balances conflicting demands—and the subsequent analysis by higher centers of the signals sent by the sense organs. Prerequisite: CVS or PSY 151 or permission of the instructor. Same as PSY 255. (Spring)

**256W. Perception with Laboratory**  
Fundamental perceptual processes investigated through laboratory demonstrations and student-conducted experiments. Prerequisites: CVS or PSY 151 and statistics, or permission of the instructor. Same as PSY 256. (Spring)

**318. Computers in Psychology**  
Programming, fundamentals, and experimental problems (e.g., timing, randomization, stimuli, response recording, data handling). Practical experience includes final project. Same as PSY 318. (Spring)

**353. Human Factors**  
Use of the data, principles, and methods of human factors in the design of specific systems. Same as PSY 353. (Spring)

**401. Introduction to Sensory Systems**  
A survey of the functional properties and underlying physiological mechanisms of sensory systems and their general biological and psychological significance. Same as PSY 401. (Fall)

**403. Introduction to Computers in Psychology**  
Programming, fundamentals, experimental problems (e.g., timing, randomization, stimuli, response recording, data handling). Practical experience includes final project. Same as PSY 403. (Fall)

**412. Mathematical Methods in Psychology**  
This course examines mathematical/computational models of visual perception, decision making, learning, and movement control. The objective is to develop technical knowledge and skills needed to formulate, evaluate, and understand such models. Same as PSY 412. (Fall)

**418. Real-Time Lab Computing**  
Deals with the particular hardware required for real-time control of experiments, and the kinds of programs and programming languages, that permit the easiest control of experiments. Focuses on the C programming language. Same as PSY 418. (Fall)

**432. Mechanisms of Vision I**  
A comprehensive introduction to the visual system for beginning graduates and advanced undergraduates. Part I focuses on early visual processing. Topics covered are basic anatomy and physiology, transduction, adaptation, spatial vision, and color vision. (Fall)

**432. Mechanisms of Vision II**  
Same as Part I, but focuses on higher-level processes. Topics covered are motion, stereo and depth perception, texture and surfaces, attention and perception of objects, eye movements and visual direction, and visual development. (Spring)

**444. Visual Development**  
A comprehensive overview of the development of the visual system: fundamental aspects of the anatomy and physiology of the developing visual system; oculomotor development; and the basic psychophysical aspects of visual development, including spatial vision, temporal vision, color vision, binocular vision, perceptual constancies, pictorial depth, and object perception. Same as PSY 444. (Spring)

**445. Computational Problems in Vision**  
An advanced seminar on the union of computational work and human vision. Topics vary but typical examples include levels of representation, parallel and serial processing, object recognition, distributed versus local representations, vision with a moving observer, and attention. Same as PSY 445. (Spring)

**446. Color Vision**  
The psychophysics and physiology of color vision, from the absorption spectra of the cone photopigments to high-level processes such as those that allow the extraction of object reflectances despite changes in the color of the illuminant. Same as PSY 446. (Fall)

**447. Visual Space Perception**  
Discusses the sources of information that allow the visual system to construct a useful representation of visual space. Topics include stereopsis and other depth mechanisms, the stability of the visual world despite head and body movements, and the problem of maintaining consistent relations between the information provided by different sensory modalities. Same as PSY 447. (Spring)

**449. Motion Perception**  
A detailed treat of what is known about psychophysical, physiological, and computational aspects of the perception of motion. Same as PSY 449. (Fall)

**492. Spatial Vision**  
The course explores the design of the human eye, revealing the optical and neural factors that limit vision in space, time, and wavelength. The course treats the information losses associated with the eye's optics, the photoreceptor mosaic, the optic nerve, and visual cortex. Same as OPT 448. (Spring)

*Part-time.
WOMEN'S STUDIES

Women's studies offers an interdisciplinary concentration leading to a bachelor's degree, supervised by the Academic Affairs Committee of the program. A minor in women's studies is also available.

STEERING AND ACADEMIC AFFAIRS COMMITTEE
Sharon Willis, Ph.D. (Cornell) Associate Professor of French Literature and Language and Director, Susan B. Anthony Center for Women's Studies
Mary Young, Ph.D. (Cornell) Professor of History
Celia Applegate, Ph.D. (Stanford) Associate Professor of History
Rosemary G. Feal, Ph.D. (SUNY, Buffalo) Associate Professor of Spanish
Lynn Gordon, Ph.D. (Chicago) Associate Professor of Education and of History
Bette London, Ph.D. (California, Berkeley) Associate Professor of English
John Michael, Ph.D. (Johns Hopkins) Associate Professor of English
Grace Seiberling, Ph.D. (Yale) Associate Professor of Art History
Thomas DiPietro, Ph.D. (Cornell) Assistant Professor of French

The field of women's studies is interdisciplinary in nature, drawing coherence from its subject matter. Using insights and methodologies of the natural and social sciences and the humanities, women's studies integrates the findings of individual disciplines. In so doing, it develops perspectives on women's experiences not afforded by any single discipline. Broader than traditional academic fields, women's studies facilitates an understanding not only of women but also the changing nature of psychological, economic, social, cultural, and political relationships between women and men.

In July of 1986 the University opened the Susan B. Anthony Center for women's studies to address curricular and scholarly issues important for understanding the role of women in contemporary society. The Center is named to honor Susan B. Anthony, the nineteenth-century suffragist who led a campaign to have women admitted to the University of Rochester in 1900. The Center is intended to advance her goals and ideals and to preserve Anthony's rich historical connections with the city of Rochester.

In addition to the existing curricular programs and the creation of a Susan B. Anthony Chair, other programs include internships in the Rochester community, public lecture series and conferences, and postdoctoral fellowships in women's studies. With the support of the Rockefeller Foundation, the Susan B. Anthony Center also provides two resident fellowships for visiting scholars and artists working in the field of feminism and visual culture.

REQUIREMENTS FOR CONCENTRATION IN WOMEN'S STUDIES
The interdepartmental major in women's studies requires 12 courses. WST 200 (Colloquium), three foundation courses, three electives in women's studies (from at least two departments), one internship, independent research, or women's studies seminar, and four allied field courses that constitute a coherent field of study (at least two in a single department or program, the remaining two in any department or program, including women's studies).

REQUIREMENTS FOR A MINOR IN WOMEN'S STUDIES
Two foundation courses, three electives. No more than two courses included in the student's major may be counted toward the minor.

COURSES OF INSTRUCTION
The following list gives a general indication of the courses that have been offered in the past academic year. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

FOUNDATION COURSES
200. Colloquium in Women's Studies.
201. Women in History.
203. Women in Politics.
204. Feminism in Literature, Art, and Media.
205. Philosophical Foundations of Feminism.
206. Psychology of Women.
207. Feminism in Science and Technology.
208. Women and Ethnicity.
394. Internship in Women's Studies.

These internships are designed to familiarize the participants with issues not only related to gender studies, but also with various methods of communication, legislation, and cultural production associated with cultural issues within the Rochester community.

Further information is available from the Susan B. Anthony Center for Women's Studies, 538 Lattimore Hall, University of Rochester, Rochester, New York 14627-0434.
The College of Engineering and Applied Science offers degree programs leading to the Bachelor of Arts (engineering science), Bachelor of Science, Master of Science, and Doctor of Philosophy degrees. Based on the fundamentals of science and engineering, the programs exist in and benefit from a strong liberal arts environment.

The undergraduate program provides education for a lifetime career, not simply training for a specific job. The program has two major objectives:

1. To prepare students for positions as practicing engineers and leaders in industry, government, education, and other areas of society.
2. To prepare students for graduate work leading to professions in medicine, law, and business as well as engineering, giving them an understanding of science and technology that will provide a firm foundation for their lifework.

The emphasis is on both individual opportunity and collaborative team effort. Students are encouraged to participate in the many active research projects in the College, and flexibility in each program makes it possible to incorporate specialized coursework. For instance, engineering students pursue elective work and undertake research projects in such fields as biomedical engineering, computer engineering, environmental studies, and materials science.

Admitted students enter the College of Engineering and Applied Science as freshmen if they have expressed an interest in an engineering concentration. Other undergraduates may enter the College, or a specific concentration within the College, at any time in their undergraduate tenure provided that they have, or can schedule, the necessary prerequisites. Engineering faculty advisors counsel interested students on degree requirements.

Four-year courses of study lead to the Bachelor of Arts (engineering science), the Bachelor of Science degree in chemical engineering, electrical engineering, geomechanics, mechanical engineering, optics, or an interdisciplinary program in engineering and applied science. The Bachelor of Science degree programs in electrical, chemical, and mechanical engineering are accredited by the Accreditation Board for Engineering and Technology; seniors in these programs are eligible to take the "Fundamentals of Engineering Examination" and are encouraged to do so. This is the first of two examinations leading to professional licensure. See pages 135–136 for details about these programs.

BACHELOR OF ARTS IN ENGINEERING SCIENCE

Another option for students, who are uncertain about their intended specialization or are interested in a broad introduction to several fields of engineering, is the B.A. (engineering science). This program provides a strong, technological education for students considering careers in law, medicine, or business, or wishing to delay engineering specialization to the graduate level. The underlying science and mathematics requirements are similar to those needed for most science and engineering concentrations. The other distribution requirements, including foreign language, are the same as those prescribed for liberal arts degrees. As a result, the decision on a wide variety of possible course selections can be made at the beginning of the junior year, later than the usual timing for prospective B.S. (engineering) students. (See page 157 for more details.)

REQUIREMENTS FOR THE DEGREE BACHELOR OF SCIENCE

In addition to the specific courses stipulated in the degree programs, students must satisfactorily complete the following:

1. Semester hour requirements: The Departments of Electrical Engineering and Optics require a minimum of 128 semester hours. For the Department of Mechanical Engineering, a minimum of 129 semester hours is required, while in the Department of Chemical Engineering, the minimum number of hours is either 130 or 132. Note: If MTH 141, 142, 143 are substituted for MTH 161, 162, students in all engineering programs except optics become responsible for four additional credits.

2. English: Entering students are advised by the Department of English in the selection of an appropriate course, normally ENG 103, 104, 107, 108, or 109. Students complete this requirement by the end of their freshman year.

3. Distribution requirements: Distribution requirements are an important and integral part of an engineering education, and should be carefully chosen with the help of faculty advisors. In completing distribution requirements, students in Bachelor of Science degree programs in chemical, electrical, mechanical engineering, or optics, or in programs in the geomechanics or interdepartmental areas, first elect to take two courses from the humanities and two from the social sciences. Then, depending on their major, an additional course or courses in either the humanities or social sciences must be taken to complete requirements. Specifically, the chemical and mechanical engineering programs require one additional course; programs in electrical engineering and in the interdepartmental, geomechanics, and optics programs require two additional courses. Another way of fulfilling distribution requirements is to choose a minor from the offerings within the humanities or social science areas (which still requires a total of five or six courses from these areas). In either option, at least one course must be above the introductory level.
Students should not in general elect social science or humanities courses that emphasize basic skills in mathematics or computer programming. Such courses may not fulfill distribution requirements. Courses cross-listed with CSC 110, for example, are unacceptable.

**a. Humanities:** any English course except ENG 101 and the course taken to satisfy the primary writing requirement (see above). [Note: in chemical engineering, ENG 113-129 are not acceptable.] Any art and art history course; any foreign and comparative literature course; any music theory or music history course; any philosophy course; any religion course; any film studies course cross-listed in a humanities department. An introductory language course (101 level) may only count as a humanities if followed by a higher-level language course in the same language. If taken alone, it may count as a free elective. Foreign language courses beyond the introductory level (e.g., 102 and higher) are considered to be humanities courses. Although foreign language is not required for the Bachelor of Science degree programs in the College of Engineering and Applied Science, students are encouraged to consider coursework in a foreign language if schedules permit.

**b. Social Sciences:** any course in African and African-American studies, any anthropology course; any economics course; any history course; any linguistics course; any political science course; any psychology course; any sociology course.

**c. Additional requirements:** After satisfying the first two social science and humanities requirements with courses in the subjects listed above, the remaining one or two required distribution courses may include music performance courses and film studies courses not cross-listed in humanities departments. Refer to individual departmental sections in this bulletin for further details.

Courses designated as CAS can be counted only as free electives. Policies regarding other elective courses are included in departmental curriculum descriptions.

NROTC students concentrating in engineering must take certain naval science courses in addition to the regular courses listed. A maximum of two NROTC courses (8 hours) may be used as free electives. Other NROTC courses must be taken as overloads.

**4. Residency requirement:** Students must be admitted to and registered in the College with an approved degree program for at least two semesters (not necessarily consecutive); during each of these two semesters, students must complete at least 12 hours of course credit at the University of Rochester.

5. Cumulative grade-point average: an average of at least 2.0 for all courses taken for credit at the University of Rochester, and an average of at least 2.0 in courses specified by the department or program of concentration.

6. Equipment fees: Once accepted into the College of Engineering and Applied Science, students become responsible for equipment fees in their junior and senior years. See the section in this bulletin on "Financing an Education" for further details.

**FLEXIBLE FIRST YEAR**

Students intending to pursue an engineering program are admitted to the College of Engineering and Applied Science as freshmen and are assigned an advisor from the engineering faculty. The typical freshman year schedule is shown below.

- **MTH 161**
- **CHM 103/105**
- **PHY 121**
- **Engineering recommendation**
- **ENG 103**
- **HUM/SS elective**

Students choose their two engineering electives in consultation with their faculty advisor. Freshmen who have chosen a major field should take the courses recommended for that concentration as indicated under specific departmental listings. Other students may use the engineering electives to explore options within the engineering fields. It is not necessary to select a major field until the end of the freshman year because appropriate engineering courses taken in the freshman year can be used as electives in each program—all required courses can be taken in the last three years.

Students may transfer into the College of Engineering and Applied Science at the University of Rochester at any time, but will find it necessary to satisfy those prerequisites that may be lacking.

**MINORS**

The College of Engineering and Applied Science recognizes all minors offered by the College of Arts and Science. In addition, the College of Engineering and Applied Science offers minors in chemical engineering, electrical engineering, and mechanical engineering. These minors are available to all undergraduates as a way to strengthen their academic program.

**MANAGEMENT STUDIES**

Students may pursue a Certificate in Management Studies through the College of Arts and Science. Further information on this program can be found on page 95.

**“TAKE FIVE” PROGRAM**

Students may extend undergraduate work beyond the normal four-year period to include additional courses related to their interests by applying to the “Take Five” Program. If accepted, students may elect an additional semester or an extra year without tuition charges. Students wishing to broaden their education beyond degree requirements should consult their faculty advisors. Those participating in the “Take Five” Program will postpone their graduation for one semester or one year, depending on the option chosen.

**TWO-DEGREE PROGRAMS**

Students may earn both a bachelor's degree in the College of Engineering and Applied Science and a B.A. or B.S. degree in a chosen liberal arts or science concentration. These students essentially complete a program similar to a two-college program, but do so entirely at the University of Rochester. Dual degrees may extend past the normal four-year time span and will not be tuition free.
B.S.-M.S. PROGRAMS
Combined B.S.-M.S. programs in electrical engineering and optics are available to those students wanting to blend their undergraduate program with graduate study. (See pages 142 and 152 for specific information.)

Students who wish to complete a bachelor’s degree in engineering and a master of business administration may be able to combine an undergraduate engineering program with work in the William E. Simon Graduate School of Business Administration. This program may require that students take an overload, summer courses, or prerequisite coursework during the junior or senior year; students should also be aware that the Simon School operates on a quarter-system calendar. Students must have solid academic records and must score well on the Graduate Management Admissions Test (GMAT), which should be taken by January of their junior year, to be considered for admission. (See page 167 for details about this program.)

TRANSFER PROGRAMS
Students with engineering interests may transfer into the College of Engineering and Applied Science from other institutions. If they have had the equivalent of the first two years of science, mathematics, and pre-engineering, such students may enter the College directly and complete their degree requirements in an additional two years. This common pattern is often described as a "2+2" program. Another pattern is for students with a science and mathematics background in a liberal arts college to transfer after three years and then concentrate on engineering courses in order to complete an engineering degree in two more years. Often, on completion of the five years the first institution will confer a B.A. degree at the same time a B.S. in engineering is awarded at Rochester. Transfer programs formalized in this way are "3-2" programs. The College has established agreements on 2+2 and 3-2 programs with a few regional institutions. However, a number of students with these transfer characteristics are admitted to the College on an individual basis. Course equivalency and credit are determined for each case. See page 199 of this bulletin for more on transfer possibilities.

DOUBLE MAJORS IN ENGINEERING
Students may earn two bachelor degrees from the College of Engineering and Applied Science under the following conditions:

1. The interdepartmental program may not be one of the two degrees, unless approved by the Administrative Committee.

2. The time span involved must be greater than that normally required for one degree. Advanced placement and summer courses may be counted as the equivalent of time.

3. The student must have the written approval of his or her advisor and the department chairs concerned. A written request should include a list of the courses being submitted for each degree, noting those being counted for both degrees. The signatures of the department chairs indicate their agreement that the proposed two-degree program meets, in their judgment, the requirements of the New York State Education Department (Memo No. 4) and the University policy approved by the Cabinet of Deans (both are on file in the Office of the Dean, College of Engineering and Applied Science).

4. After approval by the department chairs, the request should be routed to the Administrative Committee of the College of Engineering and Applied Science for final approval.

ACADEMIC INFORMATION AND ADVISING
The Dean's Office in Dewey Hall assists students with course changes, summer school approval, preparation for graduate and professional study, independent study and special courses, and academic petitions. For specific regulations on these and other aspects of program planning, turn to the Academic Services and Information section of this bulletin (pages 175–181).

College of Engineering and Applied Science faculty advisors are assigned to each known prospective engineering student in the freshman year to provide information about different engineering fields and to help students plan and review course schedules and degree programs. The Dean's Office coordinates the advising process, and every attempt is made to match advisors with individual interests and needs.

All courses in the College are taught by full-time faculty members with professorial rank or by part-time faculty members with the rank of professor or lecturer. In courses that have more than 25 students, student teaching assistants may aid the professor in supervising laboratory sessions, running regularly scheduled problem sessions, or grading homework.

CHEMICAL ENGINEERING

Shaw-Horning Chen, Ph.D. (Minnesota) Professor of Chemical Engineering and Scientist, Laboratory for Laser Energetics
Martin Robert Feinberg, Ph.D. (Princeton) Professor of Chemical Engineering
John Royal Ferton, Ph.D. (Wisconsin) Professor of Chemical Engineering
John C. Friedly, Ph.D. (California, Berkeley) Professor of Chemical Engineering and Associate Dean for Undergraduate Programs
Jacob Jorne, Ph.D. (California, Berkeley) Professor of Chemical Engineering
Robert H. Notter, Ph.D. (Washington, M.D. (Rochester) Professor of Pediatrics, Professor of Chemical Engineering and Associate Dean for Graduate Studies
Jacob Jorne, Ph.D. (California, Berkeley) Professor of Chemical Engineering
Eldred H. Chinowitz, Ph.D. (Connecticut) Associate Professor of Chemical Engineering
Richard H. Heist, Ph.D. (Purdue) Associate Professor of Chemical Engineering and Associate Dean for Graduate Studies
Samson A. Jenekhe, Ph.D. (Minnesota) Associate Professor of Chemical Engineering
J. H. David Wu, Ph.D. (M.I.T.) Assistant Professor of Chemical Engineering and of Microbiology and Immunology
Thor Olsen, Siv. Ing. (Technical University of Norway) Instructor and Laboratory Supervisor
Richard Frederick Eisenberg, M.S. (Rochester) Professor Emeritus of Chemical Engineering

Chemical engineers apply the chemical and physical sciences to the solution of practical problems. They are often work in the chemical industry supervising design and construction of new manufacturing units, seeing that these operate economically and efficiently, accumulating and analyzing scientific information needed for useful process designs, and taking part in the development and marketing of new products. They may also

*Licensed professional engineer.
use their engineering backgrounds in a wide variety of other occupations. For example, chemical engineers may enter legal work, particularly in patent law; their special understanding of chemical and physical processes is invaluable for further training in medical or biomedical research. Some of our recent graduates work as environmental engineers, design biochemical processes, and develop new materials or processing methods for the microelectronics industry.

The versatility demanded of chemical engineers requires that their abilities to use the basic sciences be especially well developed. Moreover, because the solutions to society’s problems frequently involve questions which transcend technical considerations and because our faculty is committed to a true university education for chemical engineering students, the curriculum is designed to include humanities and social sciences as well as the physical and biological sciences, mathematics, and engineering.

Courses in chemical engineering are coordinated with separate chemical engineering laboratory courses in the junior and senior years. In these lab courses, students explore fundamental concepts learned in lectures, and gain experience in problem definition and experiment design in a project format. All laboratories make extensive use of microcomputers for data acquisition and analysis, complementing their use for computation in other courses.

For admission to the chemical engineering department the student is required to have a grade-point average of 2.15 in all chemistry and chemical engineering courses taken during the first four semesters. For graduation a student must earn a grade-point average of 2.0 in all chemical engineering courses in addition to having an overall average of 2.0.

A minor in chemical engineering is available and is especially useful for students interested in technical management or careers which involve the assessment of technology and society.

ADVISING

Each student is assisted by a faculty advisor in planning an individual program of study, especially in the choice of electives. Faculty advisors help students to make sure that programs satisfy minimum degree requirements and, in addition, the minimum professional accreditation requirements of the Accreditation Board for Engineering and Technology and of the American Institute of Chemical Engineers. Concentrators in chemical engineering are required to file current program forms with their advisor each semester demonstrating how their selection of courses will be used to meet department and accreditation requirements.

ELECTIVES

The program consists of the equivalent of 31 4-credit courses plus three chemical engineering laboratories (for 8 credits) and an organic chemistry laboratory. Depending on which organic laboratory and which chemistry elective is chosen, the program will total 131 to 133 credit hours. Eleven courses (44 credit hours) in the four-year program are electives; a five-year enriched program includes an additional eight. Five electives are distribution courses which must include two humanities and two social science subjects (see page 135) or an approved humanities or social science minor. ENG 113-129 do not count toward these distribution requirements in the chemical engineering program. One elective (or none in an enriched program) may be used however the student wishes. Not all distribution electives can be at an introductory level.

The five remaining electives are chosen from technical courses in consultation with faculty advisors. These technical electives are subject to the following restrictions:

1. One course must be in applied mathematics.
2. One course must be in advanced chemistry to supplement the five required chemistry courses in the typical four-year program below. Any chemistry course beyond the required sequence is acceptable, except for CHM 219. In addition, chemistry-related courses in the chemical engineering department, such as CHE 260 and CHE 286, may be used to fulfill this requirement. Certain courses in other departments, for example, BIO 150, GEO 248, or BCH 401, are also acceptable.
3. The three remaining technical courses must include a chemical engineering course of at least 2 credits that covers an application to new technologies. The balance must be chosen to satisfy minimum professional accreditation requirements regarding engineering science and design content. The department maintains a current list of acceptable chemical engineering electives and equivalent credit hours of content for each undergraduate engineering course.

Technical electives may be chosen to broaden the student’s engineering background or to pursue an area of special personal interest in more depth. These courses are usually completed in the junior and senior year and normally do not include more than one course at the 100 level. Qualified undergraduates should also consider 400-level graduate courses, or personal research or design projects as technical electives. Students are urged to consult widely and select their technical electives carefully. Some opportunities for in-depth study include:

- biotechnology — problems of common interest to biologists, biochemists, physicians, and engineers
- polymers and plastics — their structure, properties, and manufacture
- energy resources — fossil fuels, their production, chemical processing, and uses; other sources: solar, hydroelectric, geothermal, etc.
- systems and controls — the behavior of complex chemical processes and their on-line control
- environmental engineering — engineering methods applied to community or ecological problems
- surfactant chemistry and catalysis — unique properties of interfaces separating solids, liquids, and gases
- computer applications — computer use in chemical processing systems.

COMPUTER COMPETENCY

All chemical engineering students are required to develop competency in structured programming with a high-level computing language. In addition, students must become familiar with the use of microcomputers supporting the MS-DOS environment. These requirements should be met before entering the third year of undergraduate study. Typically, minimum competency is achieved by successfully completing CHE 116, Fundamentals of Computing. This course introduces the FORTRAN language, which is used on the department microcomputers for data acquisition and control in the laboratories and for more advanced simulations and calculations in upper-level lecture and design courses.

As an alternative to CHE 116, students who have earned at least a B- in EE 171 or equivalent, or have earned a 4 or 5 on the AP Computer Science exam, can choose instead to accept the responsibility to learn the FORTRAN language and MS-DOS on an independent basis. Such students must complete 2 credits of a free elective in place of the CHE 116 requirement.

FRESHMAN CHE COURSES

The chemical engineering department provides two ways for new students to gain a better understanding of what chemical engineers do. In the fall term, all entering students with an interest in chemical engineering are encouraged to take the noncredit seminar course CHE 92. Students meet once per week with selected faculty and/or engineers from local industry to learn about various aspects of the discipline and the diversity of employment opportunities. In the spring term, special CHE electives are taught for freshmen only. These seminar-style courses give students a chance to explore contemporary issues relating to chemical engineering in an informal atmosphere.
TYPICAL FOUR-YEAR PROGRAM

First Year
MTH 161\(^1\) or MTH 162\(^1\)  
CHM 105\(^1\) or CHM 106\(^2\)  
English  
CHE 92  
Elective

Second Year
MTH 163\(^3\)  
CHM 205, 209\(^3\)  
CHE 113  
Elective

Third Year
CHE 244, 245  
CHE 225  
PHY 122  
Elective

Fourth Year
CHE 272  
CHE 255  
CHEM 251  
Elective

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and in some cases, courses that are new for 1993–94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

92. Introduction to Chemical Engineering. No credit. Group discussions of chemical engineering's current problems and relationship to the community. For entering students who are considering chemical engineering as their intended field of concentration.

102. Global Warming. Credit—2 hours. A chemical engineering analysis of the factors that affect global climatic change, with primary emphasis on global thermal effects, the greenhouse effect, and the role of atmospheric pollutants, biochemical processes, various engineering courses, and public policies on the issue of global warming. (This course is designed for freshmen only.)

104. Engineering Decision Making. Credit—2 hours. A first course in modeling and optimization. The importance of mathematical models and clearly stated objectives. Decision making in both deterministic and probabilistic settings. (Freshmen only.)

113. Chemical Process Analysis. Formulation and solution of chemical engineering problems involving physical and chemical changes and accompanying energy effects. Stoichiometric and compositional relationships, material and energy balances, materials properties, chemical processing systems. Prerequisites: CHM 103 (or CHM 105), MTH 143 or 162.

116. Fundamentals of Computing. Credit—2 hours. Introduction to techniques of computing in an MS-DOS environment with the FORTRAN language. Emphasis is on structured programming for the solution of engineering problems. Elementary numerical techniques are introduced.

225. Thermodynamics. Application of thermodynamics to chemical engineering problems. The thermodynamic potential is formalized from postulates and applied quantitatively to ideal and non-ideal systems. Complex equilibria involving multi-component, multiphase, reacting systems.

231. Chemical Reactor Design. Review of chemical kinetics, methods of kinetic data collection, analysis, and interpretation; calculation of simple reactor designs. Emphasis is on homogeneous uncatalyzed reactions, but heterogeneous and catalyzed reactions are considered. Prerequisites: MTH 163, CHE 113.

243. Fluid Dynamics. Basic principles of fluid flow, conservation of mass, momentum, laminar flow problems, dimensional analysis, macroscopic balances, and design of fluid flow systems. Prerequisites: PHY 121, MTH 163 (may be concurrent).

244. Heat and Mass Transfer. Continuation of CHE 243. Theory of energy and mass transfer with reference to diffusive and convective transport of material and energy in static and flowing systems. Prerequisite: CHE 243.

245. Data Acquisition and Measurements Laboratory. Credit—2 hours. Laboratory safety, treatment of data, computing for real-time data acquisition and processing. Required experiments involve physical property measurement, gas chromatography, and fluid mechanics. Group projects, preliminary experiment design, as well as written and oral reports, are required.

246. Laboratory in Chemical Engineering Principles. Credit—3 hours. Hands-on experience with concepts in phase equilibrium, heat and mass transfer, and chemical kinetics. Emphasis on measurement techniques, data analysis, and experimental design. Involves structured experiments, open-ended projects, and oral and written reports.

250. Separation Processes. Application of mass transfer and thermodynamics to chemical separation techniques. Fundamentals and design of processes such as distillation, absorption, extraction, and crystallization. Fixed-bed operations, such as ion exchange and chromatography, and membrane processes are also considered.

255. Laboratory in Chemical Engineering Processes. Credit—3 hours. Operation and scale-up of chemical process equipment for chemical reaction and purification. Examination of the factors that affect performance in practice. Exploratory experiments and preliminary experimental design, as well as oral and written reports, are required. Prerequisites: CHE 243 and 244 and typically CHE 231 and 250.

256. Advanced Topics Laboratory. Credit—1 to 4 hours. Design studies and independent projects. Some examples are chemical process systems, biochemical and biomedical applications, polymers and plastics, reactors and separators, environmental problems, energy usage, food technology, and on-line computer control.


264. Elements of Environmental Engineering. Credit—2 hours. Engineering methodology for the analysis of environmental processes. The conceptual framework and basic engineering principles needed to critically evaluate environmental problems is presented and applied to contemporary issues. Prerequisites: MTH 161, 162, and CHEM 103 or equivalent.

265. Transport of Contaminants in Groundwater. Credit—2 hours. Elementary analysis of how chemical contaminants are transported and transformed in aquifers. Principles governing flow through porous media, dispersion, contaminant retardation, and chemical conversion are illustrated with contemporary case studies of contamination. Prerequisites: MTH 161 and 162, CHEM 103, and CHE 264 or equivalent.


272. Process Dynamics and Control. Introduction to modeling chemical engineering systems and studying their dynamic behavior. Analysis and design of feedback control systems. Introduction to the design of digital controllers. Prerequisite: CHE 113.

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\(^1\) An alternative approved sequence is MTH 171, 172, 173 for those considered eligible by the Department of Mathematics. An acceptable alternative sequence to MTH 161, 162 is MTH 141, 142, 143 (but only 8 credits can be counted toward the degree requirements).

\(^2\) This chemistry sequence is recommended for those considered eligible by the Department of Chemistry, but the alternative sequence of CHM 103, 104, 203, 204, 207 is also acceptable.

\(^3\) CHEM 210 is an elective course which may be used in conjunction with CHM 209 to satisfy the advanced chemistry elective requirement.
273. Chemical Engineering Process Design I. An intensive course for seniors involving the formulation and solution of entire chemical process flowsheets. Course covers fundamental material in thermodynamics, applied mathematics, computer programming and energy systems design. Concepts are illustrated with two major design projects. Prerequisites: CHE 231, 250, or permission of the instructor.


277. Energy Resources and Utilization. Emphasis on the chemical engineering aspects of various energy problems: combustion of fossil fuels for heat and work; coal gasification and liquefaction; nuclear energy; solar energy; environmental and economic considerations.

278. Structure of Chemical Processing Industries. Quantitative presentation and analysis of the production of chemicals and related products by firms in the chemical process industries; the organization and use of resources of manpower, capital, plant and equipment, technology and innovation.

279. Chemical Engineering Practice. Credit—1 hour. Issues of relevance to the practice of chemical engineering. Topics include basic economic principles and marketing issues, ethics, plant safety, worker education and training, and environmental implications in process designs. Students visit a local industry to gain perspective on the scale of a chemical process. Presentations by practicing engineers demonstrate the versatility of a chemical engineering education.


282. Processing of Microelectronic Devices. An overview of processes used in the fabrication of microelectronic devices. The application of chemical engineering principles to the analysis, modelling, and processing of microelectronic devices. Topics include introduction to physics and technology of semiconductor devices, manufacturing of device grade silicon, microlithography, thermal processing, chemical vapor deposition, etching, and ion implantation.

286. Fundamentals of Polymeric Materials. This course features the science of synthetic macromolecules. Topics covered include polymerization reactions, characterization of polymers, and structure and properties of both crystalline and amorphous polymeric materials.

391. Reading Course. See approval procedures for Independent Study on page 177.

392. Special Topics. New technologies, special applications, and developments in chemical engineering and related areas for juniors and seniors; subjects vary from year to year.

393. Special Project, Essay, or Thesis. See approval procedures for Independent Study on page 177.

396. Chemical Engineering Projects. Credit 1 to 4 hours. Students pursue original problems related to chemical engineering. Projects may be experimental, theoretical, or computational. Prerequisite: permission of the instructor.

The following graduate-level courses are open to qualified undergraduates.

411. Applied Mathematics for Chemical Engineering I.

412. Applied Mathematics for Chemical Engineering II.

413. Numerical Methods for Chemical Engineering.

415. Chemical Reaction Networks.

421. Classical and Statistical Thermodynamics.

422. Phase Equilibria.

423. Applications of Statistical Mechanics.

424. Two-Dimensional Equilibrium Structures.


432. Polymerization Reaction Engineering.

433. Mixing with Chemical Reactions.

441. Principles of Transport Phenomena.

443. Molecular Basis of Transport Phenomena.

447. Heat Transfer.


451. Physical Chemistry of Interfaces.

452. The Kinetics of Phase Transitions.

453. Micelle Chemistry.

454. Interfacial Mechanics.

455. Gas-Solid Interactions.

458. Electrochemical Engineering.


468. Industrial Microbiology.

469. Biochemical Engineering.

470. Advanced Unit Operations.

471. Process Dynamics I.

472. Process Dynamics II.


474. Process Control.

475. Optimization.

480. Structure and Bonding of Solids.

481. Corrosion.

484. Polymer Surfaces and Adhesion.


486. Polymer Science.

487. Polymer Processing.

488. Polymer Morphology.

489. Polymer Blends and Composites.
Ting Gong, Ph.D. (Princeton)  
Scientist and  
Assistant Professor of Electrical Engineering

Michael J. Wengler, Ph.D. (California  
Institute of Technology)  
Assistant  
Professor of Electrical Engineering

Andrzej Kransiewski, Ph.D., D.S. (Warsaw  
University of Technology)  
Adjunct  
Associate Professor of Engineering

M. Ibrahim Sezan, Ph.D. (R.I.P.)  
Adjunct  
Associate Professor of Electrical Engineering

Roman Sobolewski, Ph.D. (Polish Academy of  
Sciences)  
Senior Scientist of Electrical Engineering and Laser Energetics, and  
Adjunct Associate Professor in Electrical Engineering

Eric Carr Everbach, Ph.D. (Yale)  
Adjunct  
Assistant Professor of Electrical Engineering

David T. Blackstock, Ph.D. (Harvard)  
Visiting Professor of Electrical Engineering

*Victor Vincent Derenfko, M.S. (Virginia)  
Senior Lecturer in Electrical Engineering

Edwin Lorenz Carstensen, Ph.D.  
(Yale)  
Yates Professor of Engineering Emeritus; Professor of  
Electrical Engineering Emeritus; and  
Senior Scientist of Electrical Engineering

Hugh Guthrie Flynn, Ph.D. (Wisconsin)  
Professor Emeritus of Electrical  
Engineering

Lloyd Philip Hunter, D.Sc. (Carnegie  
Institute of Technology)  
Professor Emeritus of Electrical Engineering

*Edwin Kinnen, Ph.D. (Purdue)  
Senior Scientist and Professor Emeritus of  
Electrical Engineering

Much of the modern landscape has been reshaped by electrical engineers. Technologies such as television, cellular phones, computer networks, and ultrasound scans have worldwide distribution and make possible many new and productive activities. To turn ideas into reality, electrical engineers need to understand the physical principles underlying electrical phenomena and the mathematical formulae used to describe the behavior of electrical systems. Furthermore, they need to learn and to practice the principles of design and problem solving so that they can apply their knowledge efficiently and effectively. Finally, they need to keep themselves informed of new developments in science and technology in order to handle tomorrow's challenges.

UNDERGRADUATE PROGRAMS

The bachelor of science electrical engineering curriculum at the University of Rochester encourages students to pursue individual interests and goals with respect to both general education and professional training. The curriculum emphasizes fundamentals that prepare a student for lifelong learning to meet the career challenges presented by rapidly changing technologies.

Curricular flexibility in the third and fourth year permits specialization in traditional fields such as communications, systems, and electromagnetics, as well as in the newer fields of microelectronics, solid-state devices, computer engineering, and biomedical engineering. A premedical program is available for students interested in the combination of engineering and medicine. In addition, students interested in law or management may take preparatory courses in these subjects as electives. Study of related social, behavioral, and biological disciplines is also encouraged. The curriculum is based on a set of lower- and upper-division core courses required of all students and emphasizing the application of mathematical, computer, and physical concepts to the solution of engineering problems. Many of the undergraduate courses include laboratory work intended to provide students with extensive design experience.

At the end of the second year, all students select an area of concentration which specifies a sequence of upper-division courses and a senior design project. The senior design project is carried out under the supervision of an electrical engineering faculty member. Undergraduate students are also encouraged to participate in active research programs under the direction of University faculty by enrolling in special project courses (EE 396).

A distinctive feature of the curriculum is the removal of artificial boundaries between undergraduate and graduate courses. Basic graduate courses can be taken by undergraduates in addition to advanced undergraduate electives. This feature facilitates preparation for graduate study in electrical engineering or in related areas such as computer science. The Department of Electrical Engineering is revising its curriculum. Changes in offerings and scheduling are likely to occur. Contact the Department for up-to-date information.

STANDARD FOUR-YEAR PROGRAM

Below is the standard four-year, 128-credit-hour bachelor of science electrical engineering curriculum, showing the University requirements, electrical engineering core courses, and other departmental requirements. The order of completion of upper-division requirements is primarily in the hands of the student and his or her advisor, although attention must be given early in the program planning to prerequisites.

First Year

EE 101  
MTH 161  
CHM 103 or 105  
ENG 103 or 104

Second Year

EE 111  
MTH 162  
PHY 122  
Elective (hum. or  
soc. sci.)*

Third and Fourth Years

EE 223  
EE 231  
EE 241

Plus the following:

• Three electrical engineering courses from an approved set†
• One electrical engineering senior design course‡
• Three additional humanities or social science electives¶
• One nonelectrical engineering science elective§
• Two or three free electives

All fourth-year students are required to take a 2-credit-hour senior seminar during the fall semester. This course examines and discusses some of the ethical, social, economic, and safety considerations that arise in engineering practice.

†Another introductory engineering elective may be substituted for EE 101.
‡An alternative approved sequence is MTH 131, 132, 133, 134 for those considered eligible by the Department of Mathematics. Another acceptable alternative sequence to MTH 161, 162 is MTH 141, 142, 143. Note: When the MTH 141, 142, 143 sequence is taken, a total of 152 credit hours is required for the bachelor of science electrical engineering degree.
¶Not all of these courses can be at the introductory level. ENG 101 cannot be used to fulfill a humanities requirement.
§Refer to Appendix 5 of the Curriculum guide for EE majors for a list of acceptable electives.

*Licensed professional engineer.
ACCREDITATION

In making specific course selections, a student's program of study must satisfy not only the core requirements shown in the standard curriculum above but also certain minimum professional accreditation requirements established by the Accreditation Board for Engineering and Technology (ABET) and the Institute of Electrical and Electronics Engineers (IEEE). These are:

- Humanities and Social Science: ½ year (16 credit hours)
- Mathematics and Basic Science: 1 year (32 credit hours)
- Engineering: 1 year (32 credit hours)
- Engineering Design: ½ year (16 credit hours)

Full details of the ABET/IEEE degree accreditation requirements are found in the Curriculum guide for EE majors.

ADMISSION

To be considered for admission to a concentration in electrical engineering, a student must have passed the four required freshman-sophomore courses, EE 101, 171, 111, 212, or equivalent, with a minimum grade-point average of 2.3 in these courses. In addition, a minimum grade-point average of 2.0 must be achieved overall.

Note that at least three of these four required courses must be taken at the University of Rochester, except for students who have been admitted directly into the program via the transfer admissions process. Only the courses taken at Rochester are used in calculating the grade-point average.

Any student who wishes to major in electrical engineering is required to file a Concentration Approval Form together with a complete EE Program Planning Form approved by a faculty advisor during the fourth semester of study. For graduation, electrical engineering majors are required to achieve a cumulative grade-point average of at least 2.0 in the nine courses constituting the undergraduate core.

Students who desire a more flexible program and who elect to forgo an ABET-accredited degree may plan a degree program leading to a B.A. in engineering science (see page 153), or plan a degree program under the Interdepartmental Program (see page 156).

COMPUTER ENGINEERING

Students who wish an ABET-accredited degree program that may include appreciable computer engineering should enroll in the electrical engineering degree program. Students may include at least nine computer courses in a program that satisfies all academic and professional accreditation requirements for the B.S. in electrical engineering. The first two years of a typical program are identical to those shown above. In the junior and senior years, students would take courses in computer architecture and computer design.

The Department recommends that all students who plan computer engineering specializations include at least one sequence in computer hardware and one sequence in computer software. It is also recommended that such students seek the advice of the Department in planning their programs.

B.S.-M.S. PROGRAM IN ELECTRICAL ENGINEERING

Electrical engineering juniors contemplating graduate work should consider the special five-year program outlined below. Students are accepted into this program in the spring of their junior year and can begin master's level independent work in their senior year. At the end of the five-year program, both a B.S. and an M.S. in electrical engineering are awarded. Students may pursue either a Plan A (with thesis) or a Plan B (with a comprehensive examination) M.S. degree program. The chief advantage of this program is that it provides a smooth transition into graduate study with no deficiency or discontinuity between undergraduate preparation and graduate work. Another advantage is the increased flexibility that the additional EE courses provide the student in satisfying accreditation and minimum curriculum requirements.

To be accepted, students must have a good academic record and must have completed the lower-division core courses and at least two of the upper-division core courses by the end of their junior year. Students admitted to the program may also compete with other M.S. candidates for financial aid in the fifth year.

B.S.-M.S. PROGRAM EXAMPLE

**Fourth Year**

- EE core course
- EE elective
- Technical elective
- Elective (hum. or soc. sci.)

**Fifth Year**

- EE 495 or EE 400-level elective
- EE 410 or EE 400-level elective
- EE elective
- Technical elective

Not less than six nor more than 12 hours of EE 495 may be used in the Plan A degree. For those students intending to pursue a Ph.D. degree at the University of Rochester, there is the additional requirement that, if the Plan A program is followed, the comprehensive examination must be taken in addition to the normal Plan A requirements.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. Introduction to Electrical Engineering. Basic concepts of electronics as applied to engineering problem solving. Fundamental building blocks of analog and digital circuits. Topics include: charge, current, and voltage as fundamental quantities, passive, RLC elements, diode, transistors, amplifiers, and elementary networks, feedback, elementary analog system, boolean algebra, elementary switching circuit analysis and design. Prerequisites: concurrent registration with MTH 161.

COMPUTERS AND COMPUTATION

171. Introduction to Computers and Programming. Algorithmic formulation of computing problems. Introduction to Pascal programming. Topics include: structured programming, introduction to data structures, database management, and other applications. No prerequisites.


*B* See the Official Bulletin: Graduate Studies for a description of the Plan A and Plan B M.S. degree options.
201. **Computer Organization.** Registers, data paths, processors. Coding of binary data. Pipelining, memory interleaving, cache memories. Parallel processors, and interconnection networks. Laboratory. Prerequisites: EE 172, EE 200.

209. **Computer Design Project.** This is a senior design course for a concentration in "Computer Design." Design and implementation of central-processing, memory, and input/output units. Term design project performed in a team of two persons. Prerequisites: EE 172, EE 200.

405. **Data and Computer Communications.** Data transmission and encoding. Error detection techniques. Automatic repeat request (ARQ) protocols. Medium access control techniques. Aloha, CSMA/CD, Token Ring, FDDI. Network control stability. Semester-long project on sliding window protocols. Prerequisites: EE 200 and permission of instructor.

406. **Numerical Computation and Analysis.** Machine computation and number systems. Approximation and analysis of numerical errors. Iteration, convergence, and numerical stability. Minimization problems. Interpolation and extrapolation. Numerical integration and differentiation. Initial-value problems. Linear algebraic problems. Eigenvalue problems, as time permits. Prerequisite: MTH 161 through MTH 164 and EE 410, or equivalents. Working knowledge of a high-level programming language, such as FORTRAN.


492. **Special Topics: Computer Networks.** Network functions and protocol concepts. OSI reference model. Flow and congestion control. Queuing theory. Design issues. Prerequisites: EE 242 and permission of instructor.

**SYSTEMS AND CONTROL**


211. **Circuits.** Circuit analysis considering passive RLC elements, ideal and controlled sources. Network theorems, steady state and transient solutions. Complex frequency, harmonic wave-form analysis. Two-port network descriptions. Laboratory. Prerequisites: concurrent registration in MTH 163 and PHY 122.

212. **Systems.** Systems descriptions with application to circuits; vector/matrix formulation of equations, equivalent circuits, nonminimum and biasing. Fourier transforms, convolution. Laplace transforms, transfer functions, multiport networks, feedback. Laboratory. Prerequisites: EE 111, MTH 163, and concurrent registration in MTH 164.


216. **Microprocessors and Data Conversion.** Characteristics and specifications of microcomputer components including microprocessors, memories, and interfacing devices. Additional topics covered are machine language programs, data conversion, and database configurations. Laboratory. Prerequisites: EE 172, 212.


410. **Linear Systems.** Analysis of both continuous and discrete linear systems using state space techniques. Controllability, observability, and stability of dynamical systems. Linear state variable feedback. Asymptotic observers. Prerequisite: Permission of instructor.

**SOLID STATE ELECTRONICS**


223. **Solid State Electronics.** Semiconductor transport properties. DC and AC characteristics of pn junction diodes, bipolar junction transistors, and MOS devices, modeling of transistors, transient analyses. Laboratory: electrical measurements as a probe to the characterization of devices. Prerequisites: PHY 123, MTH 164, EE 111.

224. **Introduction to Electronic Circuits.** Introduction to the analysis and design of analog integrated circuits. Semiconductor diode circuits. Amplification stages containing one transistor and multiple transistors. Small-signal analysis, bias design, time and frequency response of BJT and MOSFET circuits. IC amplifier design, circuit simulation models. Laboratory. Prerequisites: EE 212, 223.


327. **Solid State Electronics Laboratory.** Laboratory course involving techniques of device fabrication related to solid-state electronic components. Data analysis, thin films, ion implantation, UV lithography, and wafer processing. This course may not be taken for credit more than once. Students interested in further laboratory projects may register under EE 396. Prerequisites: EE 223 and permission of instructor.
328. **Solid State Device Design Project.** This is a senior design course for a concentration in "Solid State Devices." Students must have prior approval from a faculty member for a design project proposal. Each student will work closely with the faculty member supervising the project. Progress reports, a written final report, and a final oral report on the project are required. Teams of two or three students may be appropriate for some projects.

420. **Physics of Solid State Devices.** Elements of solid state theory. Topics include: crystal lattices, lattice vibrations and phonons, energy band theory, semiconductor crystals, donor-acceptor statistics and electron transport in semiconductors, collective phenomena.


423. **Modeling and Simulation of Integrated Circuit Processes.** Analysis of computer models for integrated circuit process, device, and circuit simulation. Investigation and development of numerical methods commonly used in simulation. Application of standard CAD tools. Term project. Prerequisite: EE 224; EE 422 preferred.

425. **Superconductivity and the Josephson Effect.** Introduction to superconductivity, electron tunneling, and properties of barriers between superconductors. DC and AC Josephson effects. Prerequisites: EE 232, 220, or equivalent.

426. **Superconducting Electronics.** Low noise, low power, high speed, superconducting electronic devices, both analog and digital. Prerequisite: EE 232, EE 220, or equivalent.

461. **VLSI Systems I.** Core content is the same as EE 261, but requires more advanced design projects and design aids or tools. Study of current technical literature is required.

462. **VLSI Systems II.** Core content is the same as EE 262, but requires more advanced design projects and design aids or tools. Study of current technical literature is required.

463. **Analog Integrated Circuit Design.** Design methods for analog integrated circuits. Analog macrocells, switched capacitor filters, monolithic continuous-time filters, and precision analog-to-digital conversion. Device model parameter extraction. Computer-aided design techniques. IC design project and paper review. Prerequisites: EE 225, 261, or permission of instructor.


465. **Performance Issues in VLSI/IC Design and Analysis.** Primary and recent research in the fields of high-performance digital and analog VLSI design and analysis. The focus is to provide insight into some of the more active performance research areas of the field. Prerequisite: Permission of instructor.

**FIELDS AND WAVES**


235/435. **Introduction to Optoelectronics.** Introduction to the fundamentals of wave propagation in materials, waveguides and fibers, generation, modulation and detection of light using semiconductor devices, and elements of optocommunication systems. Prerequisites: EE 231 and EE 223, or equivalent.

431. **Microwaves.** Generation, transmission, control, and detection of rf energy at microwave frequencies. Transmission of guided waves, impedance transformation and matching, cavities, couplers, and junctions. Prerequisite: EE 232 or permission of instructor.


436. **Electromechanics of Particles.** Description and development of models for the forces, torques, and electrodynamics of particles, droplets, and bubbles in electric and magnetic fields. Prerequisite: EE 232 (permission of instructor for undergraduates).

438. **Heterogeneous Dielectrics.** Heterogeneous dielectric and conductive media, Maxwell's and other formulae, the Wiener limits, granular materials. Maxwell-Wagner polarization and circuit representations for lossy heterogeneous dielectrics. Nonlinear models. Heterogeneity in magnetic and semi-conducting materials. Prerequisite: EE 232 (permission of instructor for undergraduates).

450. **Bioelectric Phenomena.** Passive and active dielectric properties of biological materials, including macroscopic solutions, membranes, cells, and tissues. Physical and biological effects of electric fields, including diagnostic and therapeutic uses and biological hazards of electric fields and electromagnetic radiation. Effects of low frequency magnetic fields. Prerequisite: permission of instructor.

451. **Biomedical Ultrasound.** The physical basis for the use of high-frequency sound in medicine (diagnosis, therapy, and surgery) and biology. Acoustic properties of tissues, sound propagation in tissues, including linear processes, finite amplitude sound propagation and the development of shock waves, interactions of ultrasound with gas bodies leading to the phenomenon of acoustic cavitation, thermal and nonthermal biological effects of ultrasound, ultrasonography, dosimetry, radiation diathermy, thermal surgery, lithotripsy. Prerequisite: permission of instructor.

452. **Medical Imaging—Theory and Implementation.** Physics and implementation of x-ray, ultrasonic, and MR imaging systems. Special attention is given to the Fourier transform relations and reconstruction algorithms of x-ray and ultrasonic-computed tomography, and MRI. Prerequisite: EE 242. Cross-listed with OPT 452.

453. **Medical Imaging.** Imaging methods in medicine, with emphasis on nuclear medicine, magnetic resonance imaging (MRI), endoscopic imaging, and electromagnetic imaging. Conventional x-ray, x-ray computed tomography (CT), and ultrasound imaging. Generation, propagation, detection, and processing of physical probes used for each imaging modality. Review of linear systems theory. Cross-listed with OPT 453.

**SIGNALS AND COMMUNICATIONS**

241. **Signals.** Introduction to discrete and continuous time signal theory and analysis of linear time-invariant systems. Signal representations, convolution, Fourier analysis, filtering of continuous and discrete time signals, Laplace and Z transforms. Laboratory. Prerequisites: MTH 164 and EE 212.

243. Introduction to Random Processes. Cross-listing the graduate course EE 440 to enable grading undergraduates on a different scale. The number 243 reflects that EE 242 is a prerequisite for this course.

246. Digital Signal Processing. Cross-listing the graduate course EE 446 to enable grading undergraduates on a different scale.

349. Communications, Signals, and Systems Senior Design Project. This is a senior design course for a concentration in "Communications, Signals, and Systems." Students must have prior approval from a faculty member for a design project proposal. Each student works closely with the faculty member supervising the project. Progress reports, a written final report, and a final oral report on the project are required. Teams of two or three students may be appropriate for some projects.


446. Digital Signal Processing. Review of discrete-time linear systems and random processes, Z-transforms, difference equations, and state-space formulations. Discrete Fourier analysis, circular convolutions, FFT algorithms, and optimum discrete-time filtering based on second-order statistical properties. Laboratory. Prerequisites: EE 242 and permission of instructor.


SPECIAL COURSES

391. Independent Reading.

399. Senior Seminar. Study of some of the ethical, social, economic, and safety considerations that arise in engineering practice by discussion of appropriate novels, movies, essays, videos, and other materials. Includes presentations by a number of outside speakers. Required of all fourth-year electrical engineering students.

396. Special Projects.

477. Reduction and Analysis of Noisy Data. Develops the basic ideas of sampling, statistics inference, and deduction from noisy data. Properties of various distributions, testing of hypotheses, statistical inference, analysis of variance, regression analysis and curve fitting, and nonparametric statistics, using problems and examples drawn from areas of interest. Emphasis is on appropriate use of statistical measures in reporting and drawing conclusions from data. Prerequisite: MTH 162.

492. Special Topics: Image Compression.
The Department of Mechanical Engineering offers an undergraduate program leading to the degree of bachelor of science in mechanical engineering and a program leading to the degree of bachelor of science in geomechanics. The program in geomechanics is described on page 154.

**PROGRAM IN MECHANICAL ENGINEERING**

Mechanical engineers are in many ways the most versatile, flexible, and broadly based engineers in the profession. Their activities can range over such fields as energy, mechanics, manufacturing, design, transportation, materials, heat, fluids, hypersonic gases, and plasma.

The University of Rochester has offered an undergraduate degree in mechanical engineering for over 70 years. This program provides a particularly good background for graduate study in engineering and other fields, as well as effective preparation for students who enter industry immediately upon graduation. The Department strives to develop competent, creative, responsible engineers capable of assuming leadership roles in their profession.

The curriculum provides a balance of courses in the humanities and social sciences, physics, applied mathematics, and basic engineering. Emphasis is placed on the underlying fundamentals in the required engineering coursework, enabling graduates to adapt throughout their careers to rapid advances in science and technology. Training in the design process gradually supplements the analytical content of the courses as the undergraduate progresses. A required senior year sequence in design acts as a capstone course in this process. Formal oral and written presentation of each team’s final design is a key element of this course.

Many undergraduates in the Department assist faculty members in research projects during the academic year and the summer. This work can lead to publication in the professional archival literature. It is encouraged for those students so inclined. Recent projects involving undergraduates include experiments in controlled nuclear fusion using high-powered lasers, use of the electron microscope and testing machines to study engineering materials, mechanics of soldered and welded joints, studies in human microcirculation, experimental research in lubrication fluid layer buckling, and experiments on nonlinear dynamical systems.

**CURRICULUM**

The B.S. degree requires 129** credit hours, divided among science, mathematics, engineering, humanities, and social sciences.

The required engineering courses are shown below in the four-year degree program in mechanical engineering. There is an introductory course in engineering graphics; a sequence in mechanics, ME 120, 121, 226, 213; a sequence in energy and fluids, ME 123, 223, 225, 251; a materials course, ME 280; a laboratory in materials and solids, ME 242; and a laboratory in fluid dynamics, ME 241. Computational skills are absolutely necessary for modern engineering, and we require a two-course sequence in computation: an introductory course in programming and data structures (EE 171) meets this requirement) and a junior-level course in modern numerical methods, ME 211. All these are capped by the senior design sequence, ME 204, 205. Students are required to take an introductory course in circuits, typically EE 110.

For admission to the mechanical engineering major, the student must have completed the first two years as listed in the four-year degree program below. In addition, the student must have attained a grade-point average of 2.0 or better in all mechanical engineering courses taken, and an overall grade-point average of 2.0 or better.

For graduation, concentrators in the Department must obtain a cumulative average of 2.0 or higher for all required mechanical engineering courses, and an overall grade-point average of 2.0 or higher.

Students are encouraged to join and be active in the student chapter of ASME, the professional society for mechanical engineers. In addition, seniors are encouraged to take Part A of the New York State Professional Engineering License examination.

**ELECTIVES**

There are two free electives in the program, in addition to the five required distribution electives in the humanities and social sciences. These may be used to make it easier to minor in an approved field in the humanities or social sciences, acquire a language, take graduate courses in engineering, acquire some business/management skills, or generally broaden the undergraduate experience.

**DISTRIBUTION REQUIREMENTS**

There are five required courses, not all of which may be at an introductory level. Of these, at least two must be in the humanities and at least two in the social sciences. The remaining course may be either a humanities course or a social science course, or any course in the William E. Simon Graduate School of Business Administration with one of the following designations: BSI, AEC, or LAW. Alternatively, students may complete an approved humanities or social science minor.

**ACCREDITATION**

Each student is assisted by a faculty advisor in planning a program of study. In making specific course selections, each student is required to satisfy not only the course requirements given below, but also the minimum professional accreditation requirements of the Accreditation Board for Engineering and Technology. Faculty advisors should be consulted to be sure that all such requirements are met.

*Licensed professional engineer
†Part-time

**133 credit hours for those electing MTH 141-(4)
STANDARD FOUR-YEAR PROGRAM

Below is the standard four-year program for students who decide on a mechanical engineering major in their freshman year. The basic mechanics courses ME 120 and ME 121 are offered every semester. This allows an alternative four-year program for students entering the mechanical engineering major in the sophomore year.

First Year

| MTH 161 | MTH 162 |
| CHM 105/103 | PHY 121 |
| Elementary computing | Distribution elective |
| English | ME 120 |

Second Year

| MTH 163 | MTH 164 |
| PHY 122 | ME 121 |
| Distribution elective | Circuits |

Third Year

| ME 280 | ME 226 |
| ME 225 | ME 241 |
| ME 211 | ME 223 |
| Distribution elective | Distribution elective |

Fourth Year

| ME 204 | ME 205 |
| ME 242 | ME 213 |
| ME 251 | Free elective |
| Distribution elective | Free elective |

MINOR IN MECHANICAL ENGINEERING

A minor in mechanical engineering is available to give the nonmajor an opportunity to study some of the main ideas of modern engineering and acquire the skills necessary to implement them. The interested student should plan a focused program of study with any ME faculty member.

The requirements for a minor in ME are as follows:

- The student must attain passing grades in four ME courses at the 200 level or higher. The minimal acceptable GPA for these courses is 2.0.
- The student’s program of study must include at least one of the following courses: ME 204, ME 211, ME 241, ME 242, or ME 251.

In preparation for the upper-level ME courses, a student would normally take two of the introductory courses ME 120, ME 121, ME 123, or their equivalents.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993-94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.


163. Applied Differential Equations. Linear first-order equations; separable first-order equations; direction fields and elementary numerical methods. General theory of linear second-order equations; equations with constant coefficients, inhomogeneous equations; detailed treatment of oscillators, including damping, forcing, and resonance; power series solutions. Introduction to nonlinear equations and phase plane methods. Extensive treatment of applications in engineering and science. Prerequisite: MTH 162 or MTH 143.

164. Applied Vector Calculus and Linear Algebra. Review of vector algebra; scalar and vector fields; gradient, curl, and divergence; curves; surfaces; line integrals; surface integrals; Gauss’ theorem, Stokes’ theorem. Systems of linear equations; matrices and matrix algebra; matrix rank; vector spaces; eigenvalues and eigenvectors. Extensive treatment of applications in engineering and science. Prerequisite: MTH 162 or MTH 143.


204. Mechanical Design. The theory and application of structural mechanics to mechanical design. Topics include matrix structural analysis and finite element techniques. Students use the NASTRAN finite element program to solve a variety of design and analysis problems. The term project consists of a team competition to design, analyze, build, and test a lightweight structure. Prerequisites: ME 226 (ME 211 recommended).

205. Advanced Mechanical Design. This course follows ME 204 in the study of mechanical components and analysis models. There is an emphasis throughout on the use of the computer to obtain solutions and to achieve optimization. There is a semester-long team design project. Historically, design topics have been drawn from local industry and superior student designs have been built by the corporate sponsors. Prerequisite: ME 204.

211. Computational Methods in Mechanical Engineering. Introduction to FORTRAN; root finding; curve fitting; numerical differentiation; numerical integration, numerical solution of ordinary differential equations; solution of linear equations; matrix eigenvalue problems; simulation. Prerequisites: ME/MTH 163, 164.

213. Mechanical Systems. Free and forced vibration in one, two, and many degrees-of-freedom systems. Complex representation, damping, matrix methods, applications. Continuous systems; string and beam vibration. Prerequisites: ME 121, 226; ME/MTH 163, 164.

design project requiring synthesis of analytical and empirical elements. Prerequisites: ME 123, 225.

*224. Advanced Heat Transfer. This course is a continuation of ME 223, but concentrates primarily on convective heat transfer. Topics covered include momentum and heat transfer over external and internal surfaces for laminar and turbulent flows. Prerequisite: ME 223.

225. Introduction to Fluid Dynamics. Dimensional analysis, kinematics, Bernoulli's theorem, potential flow, vorticity, viscous flow, boundary layers, instability and turbulence, one-dimensional compressible flow, shock waves. Prerequisites: ME/MTH 163, 164; ME 120, 123.


*227. Applied Fluid Dynamics. Selected topics in fluid dynamics as applied in engineering practice. Topics include pipe flow, pipe networks, open-channel flow, flow in turbines and pumps, low-speed aerodynamics, drag reduction, and hydrodynamic lubrication. Assignments include design of fluid components and systems. Individual design projects. Prerequisite: ME 225.

241. Fluid Dynamics Laboratory. Introductory lectures on lab practice and data analysis. The first part of the lab uses simple experiments to familiarize the student with different instruments used in fluid dynamics, heat transfer, and heat power. In the second part, students (working in groups of three) perform experiments designed by them. Reports will be given orally in seminars. Prerequisite: ME 225.

242. Materials and Solids Laboratory. Five short projects emphasizing the mechanical behavior of solids such as tensile, torsional, and bending properties; strain gages; LVDT; and vibrations, and the instrumentation used to examine it. One independent team project is required. Prerequisites: ME 121, 226, 280.

251. Heat Power Applications. Power cycles, engines, compressors and turbines, refrigeration cycles, air conditioning, direct energy conversion, energy storage, and combustion. A design project is included. Prerequisites: ME 123, 225 (may be taken concurrently).

252. Modern Energy Conversion. Conversion of chemical and nuclear energy into mechanical and electrical energy. Energy sources and their projected use. Conventional electric power generation, thermoelectric and thermionic systems and fuel cells, fission, controlled fusion, and magnetohydrodynamic power generation. Design project. Prerequisite: ME 123.

253. Nuclear Engineering. Nuclear structure, nuclear reactions, fission, nuclear power plants, neutron diffusion, reactor theory, reactor kinetics. Team design project. Prerequisites: PHY 123, 125.

280. Introduction to Materials Science. Relationship between microstructures of solid materials and their engineering properties. The dependence of mechanical, electronic, magnetic, thermal, and chemical properties of metals, semiconductors, ceramics, polymers, and glasses on their chemical bonding, electronic structure, atomic arrangement, and phase composition. Prerequisites: ME/MTH 163, 164, PHY 123.


390. Supervised Teaching.

391. Independent Reading.

392. Special Topics Seminar.

393. Special Essay or Thesis.

394. Internship.

395. Independent Research.

*401. Methods of Applied Mathematics. Advanced ordinary differential equations (ODEs), second-order linear ODEs in the complex domain, systems of linear ODEs. Nonlinear ODEs, phase plane methods, critical points, stability, Liapunov methods, limit cycles. Perturbation methods, singular perturbations, asymptotic expansions, asymptotic evaluation of integrals. Prerequisites: ME 201 or MTH 281; ME 202 or MTH 282.


403. Computational Methods for Engineering and Science. Computational solutions to coupled nonlinear partial differential equations arising in engineering and physics. Emphasis on current problems and techniques. Some Fortran experience desirable. Prerequisite: ME 402 or PHY 401 or OPT 411 or consent of instructor.

404. Perturbation and Asymptotic Analysis. Dimensional analysis; asymptotic expansions; asymptotic techniques applied to integrals and solutions to ordinary and partial differential equations; regular and singular perturbation; boundary layer theory; turning point analysis and WKBJ theory, geometrical optics; applications to fluid mechanics and wave propagation. Prerequisites: ME 401; ME 202 or MTH 282.

405. Diffusion. Length and time scales in diffusion; analytical, numerical, and asymptotic methods. Applications selected from the following: diffusion of magnetic fields; chemically reacting systems; moving systems; diffusion and waves; diffusion in solids; free boundary problems; radiation transfer in gases; kinetic theory; random walks and diffusion. Prerequisites: ME 201 or MTH 281.


407. Advanced Dynamics. Review of principles of mechanics; generalized coordinates and constraints; Lagrange's equations, kinematics of rigid body motion; rigid body dynamics; orbital dynamics, vibrations; calculus of variations; Hamilton's principle; Hamilton's equations; canonical transformations; Hamilton-Jacobi theory; Hamiltonian theory of dispersive waves; Hamiltonian and Lagrangian formulations for continuous systems. Prerequisites: ME 121, 213; ME/MTH 163.

408. Phase Transformations. The physical, chemical, and mechanical properties of metals and alloys can be varied drastically by thermal and mechanical treatments which change their microstructure. This course is concerned with an atomic level description of these changes, including the importance of crystalllography, kinetics, and structural defects. Prerequisite: ME 460.


411. Mechanical Properties of Polymers. Structure of polymers, elastic behavior, finite strain elasticity, viscoelastic behavior of polymers, time-temperature superposition, free volume theory, relaxation processes, nonlinear and anisotropic behavior, dislocations and disclinations, yielding and fracture. Prerequisite: consent of the instructor.


*Not offered 1993-94
**Courses numbered 400 and higher are normally graduate courses. They are open to qualified undergraduates. Not all are offered every year. Definitive course listings are distributed prior to registration.

428. Geophysical Fluid Dynamics. Fluid motions in oceans and atmospheres. Static structure; Boussinesq approximation; internal gravity waves; waves in a compressible, stratified fluid; geostrophic flow; inertial waves; Ekman layers; Rossby waves; convection. Prerequisites: ME 201; ME 225 or MTH 281.


435. Introduction to Plasma Physics II. Vlasov equation, Landau damping. Van-Kampen modes, shield clouds, two-stream instability, micro-instabilities, drift instability, nonlinear instability theory, radiation from plasmas. Prerequisite: ME 434.

436. Compressible Flow. Acoustics, one-dimensional steady flow, shock waves, one-dimensional unsteady flow and the theory of characteristics, steady supersonic flow, radiative transfer in gases. Prerequisites: ME 225; ME 201 or MTH 281.

437. Viscous Flow. Viscous flow: exact solutions, small and large Reynolds number approximations, asymptotics, singular perturbation theory, examples of current interest. Prerequisites: ME 225; ME 201 or MTH 281.

440. Mechanics of Structures. Application of direct and indirect methods of the calculus of variations to the stress, deflection, and dynamic analysis of beam, ring, plate, and shell elements. Strain energy and complementary strain energy; variational principles; Lagrange multipliers. Rayleigh-Ritz method; Galerkin method; Ritz's variational principle. Prerequisite: ME 226.

441. Finite Elements. The theory and application of finite element analysis in structural mechanics and other disciplines. Topics: matrix analysis concepts; element formulation methods; element behavior and geometry; general analysis aspects; isoparametric elements; elements for C1 continuity problems; boundary element analysis. Term project requires the implementation of a finite element program. Prerequisite: ME 226.

442. Introduction to Dislocation Plasticity. Some elementary concepts in the physics of plasticity, imperfect crystals, and point, line, and surface defects. Burgers circuit and vector, Frank-Read source, partial and super dislocations, force on a dislocation, dislocation mobility, and plastic deformation. Prerequisites: ME 226, 280.


445. Plates and Shells. Analysis of stress and deformation in rectangular and circular plates bent by transverse loads. Axisymmetric deformation of shells of revolution. Asymptotic expansions; membrane and bending stress. Application to pressure vessels, tanks, and domes with various support and load conditions. Prerequisites: ME 226; ME 201 or MTH 281.

446. Wave Propagation in Elastic Media. Physical phenomena (reflection, dispersion) and mathematical techniques (Green's functions, Fourier analysis, stationary phase) are studied for waves on strings. Concepts are then used to study waves in infinite, semi-infinite and layered structures, and waves in layers and cylinders. Prerequisites: ME 121, 226; ME 201 or MTH 281.


450. Optimum Design. Nonlinear programming techniques are applied to optimize the mechanical design problem. Both constrained and unconstrained techniques are discussed. Student projects include writing a general purpose optimization program to obtain minimum weight structures. Prerequisite: ME 226 and some programming experience.

451. Crystallography and X-Ray Diffraction. Crystallography; symmetry elements, space groups, x-ray diffraction, single crystal diffraction, powder patterns, Fourier transforms, Patterson functions, grain size effects, residual stress and cold work, diffuse and small angle scattering, Bragg and Laue, x-ray topography. Weekly laboratory. Prerequisite: consent of the instructor.

452. Electron Microscopy. Kinematical theory of diffraction; reciprocal space, single crystal diffraction patterns; dynamical theory of diffraction; direct observations of localizations, stacking faults. Weekly laboratory involving use of the electron microscope. Prerequisite: ME 451 or consent of the instructor.

459. Advanced Finite Elements. Advanced topics in finite elements including vibrations, buckling, nonlinear geometry, inelastic materials and fracture mechanics. Modeling techniques and applications to problem solving stressed. Prerequisite: ME 441 or consent of the instructor.
460. Thermodynamics of Solids. Review of basic thermodynamic quantities and laws, equations of state: statistical mechanics; heat capacity; relations between physical properties; phase transformations, phase diagrams, and chemical reactions; partial molal and excess quantities, phases of variable composition; free energy of binary systems; surfaces and interfaces. The emphasis is on the physical and chemical properties of solids including stress and strain variables. Prerequisite: ME 123 or CHE 225.


462. Experimental Material Science. Six short projects emphasizing the mechanical behavior of solids such as tensile, impact and bending properties, strain gages, LVDT, and vibrations, and the instrumentation used to examine it. Required independent project in teams of three. Prerequisites: ME 121, 226, 280.


465. Laser Systems. The design and use of laser systems, emphasizing visible and near infrared lasers. The course is engineering oriented and covers techniques for measuring laser characteristics as well as a variety of laser applications. An introduction to nonlinear optics is included. Prerequisites: OPT 441, 442 or equivalent. OPT 461, 462 or equivalent (may be taken concurrently). Same as OPT 465.

471. Geometric Modeling and Engineering Graphics. Modeling and representation of solid objects and automated engineering graphics. A theory based on geometry, set theory, and topology is developed to model and represent rigid solids. Useful algorithms which operate on the representations are studied.


483. Biosolid Mechanics. Application of engineering mechanics to biological tissues including muscle, soft tissue, cell membranes, and bone. Realistic modeling of biological structures, including the heart, blood vessels, and the ear. Experimental methods and material models. Prerequisite: ME 226.

484. Topics in Microcirculation I. An examination of microcirculatory systems and the transport phenomena which occur there. Included in the topics studied are network architecture (changes with age, pathological conditions, models); hemodynamics (roles of blood cell deformabilities, aggregation, cytotic); blood flow—metabolism coupling (control); and oxygen transport. Same as BPH 440.

485. Topics in Microcirculation II. Part One—Equations of membrane equilibrium including bending, biological membrane elasticity in shear and area dilation, membrane curvature, thermal tensions in membranes, analysis of axisymmetric deformations of lamellar structures, white blood cell mechanics, marginal bands (semiextensional elastica), experimental methods. Part Two—Basic diffusion theory; Krogh cylinder; facilitated diffusion by myoglobin; oxygen delivery from red cells; ATP and ADP transport; application to oxygen distribution and consumption in skeletal muscle; experimental methods for measuring oxygen distribution. Same as BPH 441.

OPTICS

Govind P. Agrawal, Ph.D. (Indian Institute of Technology, Delhi) Professor of Optics
Robert W. Boyd, Ph.D. (California, Berkeley) Professor of Optics
*L. Nevil Davy, M.A. (Tennessee) Professor of Optics
Joseph H. Eberly, Ph.D. (Stanford) Professor of Physics and of Optics
Nicholas George, Ph.D. (California Institute of Technology) Professor of Optics
Dennis G. Hall, Ph.D. (Tennessee) Professor of Optics and Director, The Institute of Optics
Erwin Loewen, Sc.D. (M.I.T) Professor of Optics
*David L. MacAdam, Ph.D. (M.I.T) Professor of Optics
*Erich W. Marchand, Ph.D. (Rochester) Professor of Optics
R. J. Dwayne Miller, Ph.D. (Stanford) Professor of Chemistry and of Optics
Duncan T. Moore, Ph.D. (Rochester) Professor of Optics and Rudolf and Hilda Kingslake Chair in Optical Engineering
G. Michael Morris, Ph.D. (California Institute of Technology) Professor of Optics
Carlos R. Stroud, Jr., Ph.D. (Washington) Professor of Optics and of Physics
Kenneth J. Teegarden, Ph.D. (Illinois) Professor Of Optics
Brian J. Thompson, Ph.D. (Manchester) Professor of Optics and Provost of the University
David R. Williams, Ph.D. (California) Professor of Psychology, in the Center for Visual Science, and of Optics
*Jay M. Eastman, Ph.D. (Rochester) Associate Professor of Optics
Gregory W. Forbes, Ph.D. (Australian National University) Associate Professor of Optics
Stephen D. Jacobs, Ph.D. (Rochester) Senior Scientist in Laser Energetics and Associate Professor of Optics
Wolf Seka, Ph.D. (Texas) Senior Scientist in Laser Energetics and Associate Professor of Optics
Gary W. Wicks, Ph.D. (Cornell) Associate Professor of Optics
Thomas G. Brown, Ph.D. (Rochester) Assistant Professor of Optics
Susan Houde-Walter, Ph.D. (Rochester) Assistant Professor of Optics
The Institute of Optics at the University of Rochester is internationally known for teaching and research in optics. A degree in optics opens a range of career paths: Graduates of the B.S. program typically go on to activities such as system design, product development, research support, or a variety of other industrial roles. Students aiming for advanced degrees may consider either the B.S./M.S. program (discussed below) or the Ph.D. program at The Institute of Optics, or other graduate degree programs around the world.

The B.S. in optics provides fundamental courses in physical optics, geometrical optics, radiation and detectors, lasers, and numerous electives in specialized areas of optics and related fields.

An appropriate selection of these electives allows students to concentrate in such areas as optical design and fabrication, optoelectronic engineering, image processing, and biomolecular optics. Alternatively, these electives can be chosen in preparation for advanced degrees in optics, physics, or electrical engineering. Lists of suggested courses for a range of concentrations can be obtained from the Office of Undergraduate Affairs at The Institute of Optics.

Through either the Honors Program (discussed below) or courses of independent study, interested and qualified undergraduates are sometimes able to participate in faculty research projects during the school year or in the summer. Current projects include studies involving lasers, holography, image processing, and information handling, experimental studies of optical and electronic properties of matter, computer-aided lens design and evaluation, guided-wave optics, and the interaction of intense optical radiation with matter, including studies of laser-induced nuclear fusion as an energy source.

**ADMISSION REQUIREMENTS**

Students normally apply for admission to The Institute of Optics at the end of the sophomore year by submitting a concentration approval form to their advisor or to the chairman of the Undergraduate Committee. Admission requirements are as follows: (1) an overall grade-point average of at least 2.0; (2) a grade-point average of at least 2.0 in PHY 121, 122, or 142, and 123 or 143, or in those courses taken to fulfill the physics requirement; (3) a grade-point average of at least 2.0 in MTH 161, 162, 163, and 164, or in those courses taken to fulfill the math requirement; and (4) a grade of C or better in each of OPT 241 and 261. For graduation, a minimum cumulative point average of 2.0 is necessary for all courses taken in The Institute of Optics, as well as an overall average of 2.0. Additionally, a student must have at least 128 credit hours completed upon graduation.

Prospective students and undergraduates considering optics as a major are encouraged to write or to visit The Institute of Optics for more information and individual counseling.

**FOUR-YEAR PROGRAM**

**First Year**

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MTH 161</td>
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<tr>
<td>CHM 103 or 105</td>
<td>4</td>
</tr>
<tr>
<td>English</td>
<td>3</td>
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<td>EE 171</td>
<td>4</td>
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**Second Year**

<table>
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<th>Course</th>
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<tr>
<td>PHY 122 or 142</td>
<td>4</td>
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<tr>
<td>OPT 241</td>
<td>3</td>
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**Third Year**

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<tr>
<th>Course</th>
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<tr>
<td>OPT 242</td>
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<tr>
<td>MTH 281 or ME 201</td>
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<td>Elective (tech. or free)</td>
<td>1</td>
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<tr>
<td>Elective (hum. or soc. sci.)</td>
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**Fourth Year**

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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>OPT 224</td>
<td>3</td>
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<tr>
<td>OPT 256</td>
<td>3</td>
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<tr>
<td>Elective (tech. or free)</td>
<td>1</td>
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<tr>
<td>Elective (hum. or soc. sci.)</td>
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**Outstanding students are encouraged to take the physics sequence recommended for physics majors—first year: PHY 121 (fall), PHY 142 (spring); second year: PHY 143 (fall), physics elective (spring). Students choosing this sequence should also take CHM 103 before the end of the second year.**

Mastery of prerequisite courses is essential to ensure successful performance in subsequent courses. For cases in which the student has not achieved a "C-" or better in the prerequisite course(s) for a given optics course, special permission of the Optics Undergraduate Committee is required before the student is allowed to register. Optics courses may be retaken only once (without special permission). Students so advised are asked to seek guidance in planning their future program from their faculty advisors.

**DISTRIBUTION REQUIREMENTS**

Students have two options to satisfy distribution requirements for the Bachelor of Science degree in optics. In the first option, students must elect six courses in the humanities and social sciences. These requirements are satisfied by taking two courses from the humanities, two courses from the social sciences, and the remaining two courses from either field. In the second option, students may elect to minor in a humanities or social science (which generally requires a total of five or six courses from these areas). In either option, at least one course must be above the introductory level.

**TECHNICAL ELECTIVES**

Two electives must be technical electives, at least one of which must be from the College of Engineering and Applied Science (CEAS).

The following courses are approved as technical electives for optics majors:

1. Any course with a 200 number or higher from CEAS, physics and astronomy, mathematics, chemistry, or the biological sciences, with the exception of ME 201, ME 202, or any required course.
2. A computer course with a 200 number or higher.
3. EE 110. Circuits.
4. Any other technical course as approved by petition to The Institute of Optics.

**NOTE:** STT 211 and STT 212 (statistics) cannot be counted as technical electives.
221. Quantum Mechanics for Optics. Schrödinger equation, potential wells, barriers. Metals, semiconductors, insulators. Electron in a periodic potential, energy bands, Fermi statistics; hydrogen atom, periodic table, absorption, emission. Prerequisites: PHY 123 or 143; MTH 281 or ME 201, MTH 282 (may be taken concurrently).

224. Laser Systems. Optical devices including lasers, modulators, and optical wave guides. Emphasis is placed on developing the basic principles needed to design new devices, as well as an understanding of the operation of those currently in use.


232. Optomechanical Design. Concepts required to achieve goals of optical system performance, combining of glass with metal or plastic, kinematic design, material limitations, effects of gravity and temperature. Applications to optical metrology, alignment, geometry 2-D and 3-D, and generation of precision diffraction gratings. Standards for straightness, flatness, roundness, and length.


235. Optics Laboratory. Intensive laboratory course with experiments on optical imaging systems, testing of optical instruments, diffraction, interference, holography, lasers, detectors, spectroscopic instruments. Prerequisites: OPT 242 and 261.


257. Photographic Sensitometry and Image Structure. The properties and performance of the developed photographic image; density, sensitometry, tone reproduction, granularity, and sharpness; exposure and development effects; color-forming systems, light scatter, and modulation transfer function; effects of nonlinearity; Wiener spectrum, the emulsion as a noisy detector of radiation, emulsion efficiency; and methods of image-quality evaluation.

261. Interference and Diffraction. Complex representation of waves, scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; diffraction and wave formation; optical transfer function; coherent optical systems, optical data processing, and holography. Prerequisites: MTH 164 and PHY 122 or 142.

262. Electromagnetic Theory. Vector analysis, Maxwell's equations, energy flow in electromagnetic fields, dipole radiation from Lorentz atoms, partially polarized radiation, spectral line broadening, dispersion, reflection and transmission, crystal optics, electro-optics, quantum optics. Prerequisites: MTH 163, 164, and PHY 122 or 142.

391. Independent Reading.

392. Special Topics. Current offerings include: Engineering Clinic, Guided Wave Optics, and Solid-State Physics and Optical Materials. (Course descriptions and a complete listing are available from the Office of Undergraduate Affairs at The Institute of Optics.)

393. Special Essay.

395. Independent Research.

396. Honors Project. Reading or research course open by special permission to seniors in optics.

*Admission normally limited to those students enrolled in the five-year optics B.S.-M.S. program.
INTERDISCIPLINARY PROGRAMS

BIOMEDICAL ENGINEERING CERTIFICATE PROGRAM

PROGRAM COMMITTEE
Robert H. Notter, M.D., Ph.D. (Rochester, Washington) Professor of Pediatrics, of Toxicology, and of Chemical Engineering and Director, Biomedical Engineering Program
Larry A. Taber, Ph.D. (Stanford) Professor of Mechanical Engineering
Jack G. Motley, Ph.D. (Washington) Associate Professor of Electrical Engineering
David R. Williams, Ph.D. (California) Professor of Psychology, in the Center for Visual Science, and of Optics
J. H. David Wu, Ph.D. (M.I.T.) Assistant Professor of Chemical Engineering

Biomedical engineering (BME) involves the application of engineering science and methods to investigate and solve problems in living systems. In terms of subject matter, biomedical engineering potentially includes all interdisciplinary combinations which couple engineering with biology or medicine. As a result, BME provides innumerable career opportunities ranging in scope from advanced research to engineering practice in a clinical setting. By combining strong academic programs in engineering and biology with a wide variety of ongoing biomedical research activities, the College of Engineering and Applied Science has produced graduates able to undertake careers with a varying BME-component, or to go on to higher level BME study and research at the M.S. or Ph.D. level.

One of the most important advantages of the University of Rochester for BME training at all levels is the location of the College of Engineering and Applied Science (CEAS), on the River Campus, within walking distance of the Medical Center. Courses in the School of Medicine and Dentistry can be included in engineering curricula, and the converse is also true. For example, complementary courses on blood flow, tissue oxygenation, and the microcirculation are taught in the Medical Center and the CEAS. Similarly, interactive courses in microbiology and chemical engineering are offered for students interested in biochemical engineering, and courses covering bioultrasound and medical imaging involve interactions between the Departments of Electrical Engineering, Optics, and Radiology. In addition to teaching, strong BME-related research programs are also active throughout CEAS and Medical Center departments. Essentially all BME Program faculty are involved in basic or applied research, over and above any teaching responsibilities. This rich environment allows for extensive undergraduate research electives in BME (aside from graduate-level M.S. or Ph.D. thesis research).

Undergraduates may pursue biomedical engineering options by different pathways: by seeking a B.S. degree in one of the four CEAS departments (chemical, electrical, mechanical engineering, or optics) but with a cluster of BME elective courses, or by seeking either the B.S. degree in engineering and applied science or the B.A. degree in engineering science through the Interdepartmental Engineering (IDE) Program with an individual curriculum defined by the student and an IDE Program advisor. A majority of undergraduates choose the first of these options because of its more flexible career choices (traditional engineering B.S. plus a BME emphasis). In general, all mechanisms for undergraduate study of biomedical engineering (i.e., through a specific department or through the IDE Program) can be structured to satisfy premedical or predental requirements.

For either of the above pathways, formal recognition of meaningful coursework and research is recognized by a Biomedical Engineering Certificate which is issued at graduation in conjunction with a departmental (or IDE Program) B.S. or B.A. degree. Certificate requirements involve taking two introductory biological science courses, together with three upper-level BME elective courses in CEAS departments. It is recommended that one of these be an independent research elective in the laboratory of a faculty member doing BME-related research. Detailed requirements for the BME Certificate are available in the program office in Dewey Hall.
Technical electives, chosen from a number of geology and engineering offerings, include courses in geophysical fluid dynamics, optical mineralogy, materials science, advanced mechanics, heat transfer, rheology, rock mechanics, geophysics, sedimentary processes, and laboratory studies. In addition, the curriculum provides a balance of elective courses in the humanities and social sciences.

The program also allows three free electives, which each student may choose to suit his or her special interests. For example, a student can elect to study environmental problems by taking courses in air and water pollution and in ecology. Training in environmental planning and policy work may be obtained by taking courses in geology and public policy, environmental decisions and operations research. Many other special programs can be developed in such areas as water resources problems, advanced fluid dynamics of atmospheres and oceans, or advanced rock mechanics and structural geology.

As part of their studies, many undergraduates investigate problems, often of local interest, in the area of geomechanics. Recent projects include: flooding and level regulation on Lake Ontario; analysis of a proposed flood-control project on a tributary of the Genesee River; hydrologic studies of local communities; water quality problems of the Finger Lakes; experimental studies of microfracturing in granite; and laboratory modeling of the dynamics of the earth's crust and upper mantle.

For preparation in mathematics, the program requires MTH 161, 162, ME/MTH 163, and ME/MTH 164 (or the equivalent five-course sequence: MTH 141, 142, 143, ME/MTH 163, 164). The required physics courses are PHY 121, 122, and 123, and the required chemistry course is CHM 105 or 103, depending on the recommendation of the Department of Chemistry. In geology, GEO 101, 201, 224, and 283 are required; and in mechanical engineering, the requirements are ME 120, 123, 225, 226, and either 241 or 242.

In addition to the above courses, there are four technical electives, which may be any of the geology or mechanical engineering courses at the 200 level or higher, and one technical elective from any discipline, as agreed upon with the faculty advisor.

The program includes three free electives to allow a strong minor in an area of particular interest to the student, or to broaden the scope of the curriculum. Other general degree requirements are those listed on page 135.

**ADMINISTRATION**

The geomechanics degree is awarded by either the College of Arts and Science or the College of Engineering and Applied Science—the choice is made by the student. If the student chooses Arts and Science, his or her major advisor will be in the Department of Geological Sciences; if the college chosen is Engineering and Applied Science, the major advisor will be in the Department of Mechanical Engineering. In each case, the student will also have a minor advisor in the other department.

Listed below is a sample arrangement of courses. Considerable variations on this ordering are possible to accommodate transfers and special needs.

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1 Students electing this sequence must complete four additional credit hours to graduate.
OPTICS HONORS PROGRAM

The aim of this program is to offer qualified students increased exposure to the research being conducted at the Institute, increased interaction with faculty, and a chance to apply creativity to a research project. The program consists of 8 semester hours (which may be counted as technical electives). These hours include reading and research under the supervision of a faculty member. Students having a cumulative grade-point average of 3.6 or better are automatically eligible for this program. However, a 3.4 (overall) GPA is needed to maintain honors status. Students will be notified of their eligibility for the Honors Program in the spring semester of their junior year.

B.S.-M.S. PROGRAM IN OPTICS

Undergraduate juniors majoring in optics may apply for admission into a five-year program leading to both a B.S. and an M.S. degree in optics. Students may apply for this program in the fall of their junior year and, if accepted, can begin master’s-level independent work during the senior year. The B.S. is awarded at the end of the fourth year. Work or study for credit in the summer between the fourth and fifth years can be arranged, if desired. The fifth year of this program contains more advanced coursework, reading, and research than the normal curriculum. The student must meet all the requirements for the B.S. degree, as well as those for the M.S. degree, with the exception that OPT 453 may be substituted for OPT 225 in satisfying the B.S. requirements. Students may follow the master’s thesis (Plan A) or the nonthesis (Plan B) route. The thesis route is particularly recommended as it allows the student to develop a very high level of expertise in a specialized field of optics.

The normal fourth- and fifth-year programs for students in this program area are as follows:

**Fourth Year**

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<td>OPT 221</td>
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<tr>
<td>OPT 461 or 441</td>
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<tr>
<td>OPT 453</td>
<td>OPT 256</td>
<td>OPT 256</td>
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<tr>
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**Summer Work or Study (optional)**

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<tr>
<td>OPT 491, 493, or 495 (up to 6 credits)</td>
<td>OPT 491, 493, or 495 (up to 6 credits)</td>
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**Fifth-Year Thesis Route—Plan A**

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<tr>
<td>OPT 461 or 441</td>
<td>OPT 442 or 462</td>
<td>OPT 442 or 462</td>
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<tr>
<td>OPT 491</td>
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<td>OPT 495</td>
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<tr>
<td>Elective (Optics)</td>
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**Fifth-Year Non-Thesis Route—Plan B**

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<tr>
<td>OPT 461 or 441</td>
<td>OPT 462 or 442</td>
<td>OPT 462 or 442</td>
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<tr>
<td>3 Electives (Optics)</td>
<td>3 Electives (Optics)</td>
<td>3 Electives (Optics)</td>
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The elective courses in the fifth year may be any of the 400-level courses in optics. It is also recommended that the student take a sequence of courses in a particular area to develop a specialty. Certain courses in other departments are also acceptable, but such courses should be approved in advance by a faculty advisor.

COURSES OF INSTRUCTION

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–94. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

ADMINISTRATIVE FACULTY
Sheila A. Ryan, Ph.D., R.N. (Arizona)
Dean, School of Nursing; Director, Medical Center Nursing; Professor of Nursing
Ann Marie Brooks, R.N., D.N.Sc. (The Catholic University) Senior Director and Director of Nursing, Strong Memorial Hospital; Associate Dean for Nursing Practice and Associate Professor of Clinical Nursing, School of Nursing
Marilyn Aten, Ph.D., R.N. (Cornell)
Associate Dean for Academic Affairs; Director of Doctoral Program; Associate Professor of Nursing
Patricia Hinton-Walker, Ph.D., R.N. (Mississippi) Associate Dean and Director of Community Centered Practice; Associate Professor of Clinical Nursing
Mary Sue Jack, Ph.D., R.N. (Rochester) Assistant Dean for Student Affairs; Assistant Professor of Nursing

ACADEMIC FACULTY
Marilyn Aten, Ph.D., R.N. (Cornell) Associate Dean for Academic Affairs; Director of Doctoral Program; Associate Professor of Nursing
Sharon Bidwell-Cerone, Ph.D., R.N. (Rochester) Assistant Professor of Nursing
Jean Brown, Ph.D., R.N. (Rochester) Senior Research Fellow and Instructor of Nursing
Mary Dombeck, Ph.D., D.Min., R.N. (Rochester) Assistant Professor of Nursing
Melissa Gallison, Ph.D., R.N. (Washington) Assistant Professor of Nursing
Diane Hamilton, Ph.D., R.N. (Virginia) Assistant Professor of Nursing
Carol Hanks, Ph.D., R.N. (Texas) Assistant Professor of Nursing; and of Pediatrics
June Helberg, Ed.D., R.N., P.N.P., C (Rochester) Associate Professor of Nursing; Nurse Practitioner
Patricia Hollen, Ph.D., R.N. (Rochester) Assistant Professor of Nursing
Jean E. Johnson, Ph.D., R.N. (Wisconsin) Professor of Nursing; Professor of Oncology Nursing
Mary Sue Jack, Ph.D., R.N. (Rochester) Assistant Dean for Student Affairs; Assistant Professor of Nursing
Kathleen King, Ph.D., R.N. (Rochester) Assistant Professor of Nursing
Harriet Kitzman, Ph.D., R.N. (Rochester) Associate Professor of Nursing, and of Pediatrics
Phyllis Lepper, M.D., Ph.D., F.A.C.O.G. (Duke) Professor OB/GYN; and of Nursing
Jerome Lyons, Ph.D. (Rochester) Professor Emeritus of Education and Human Development; Professor of Pediatrics, Professor of Nursing
Elizabeth McAnarney, M.D. (Syracuse) Associate Professor of Pediatrics, of Psychiatry, of Medicine, and of Nursing
Darlene E. McCown, Ph.D., R.N. (Oregon) Associate Professor of Nursing
Kay Meltzky, Ph.D., R.N. (Rochester) Assistant Professor of Nursing
Bernadette Meltzky, Ph.D., R.N., C (Rochester) Assistant Professor of Nursing
David Olds, Ph.D., M.D. (Cornell) Associate Professor, CPM
Bethel Powers, Ph.D., R.N. (Rochester) Associate Professor of Nursing; Chair, Health Promotion and Maintenance
Karen Radke, Ph.D., R.N. (Indiana) Associate Professor of Nursing; Assistant Professor of Physiology
Klaus Roghmann, Ph.D. (Cologne) Professor of Sociology, of Pediatrics, of Community and Preventive Medicine, and of Nursing
Sheila A. Ryan, Ph.D., R.N. (Arizona) Dean, School of Nursing; Director, Medical Center Nursing; Professor of Nursing
Madeline H. Schmitt, Ph.D., R.N. (SUNY Buffalo) Professor of Nursing; Interim Chair, Health Restoration
Thelma J. Wells, Ph.D., R.N. (Manchester, England) Professor of Nursing

CLINICAL FACULTY
Janet Anderson, M.S., R.N. (Missouri) Assistant Professor of Clinical Nursing
Judith Baggs, Ph.D., R.N. (Rochester) Clinical Nurse Researcher, Strong Memorial Hospital; Assistant Professor of Nursing
Diane Breton, M.S., R.N. (Rochester) Assistant Professor of Nursing, Clinical Nurse Specialist
Carol Brink, M.S.P.H., R.N., C (North Carolina) Associate Professor of Clinical Nursing
Margaret Brody, M.S.N., R.N. (The Catholic University) Director of Recruitment, Associate Professor of Nursing
Ann Marie Brooks, R.N., D.N.Sc. (The Catholic University) Senior Director and Director of Nursing, SMH; Associate Dean for Nursing Practice; Associate Professor of Clinical Nursing
Doris Brownlow, M.S., R.N., C (Oregon) Nurse Practitioner, Assistant Professor of Clinical Nursing
Julie Buenting, D.N.S., C.N.M. (SUNY Buffalo) Assistant Professor of Clinical Nursing
Nancy Chevalier, M.S., R.N. (Boston) Instructor, Clinical Nursing
Patricia Chiverton, M.S., R.N. (Boston) Clinical Nurse Specialist, Assistant Professor of Clinical Nursing
Joanne Clements, M.S., R.N. (Rochester) Clinical Chief, Psychiatric Mental Health Nursing; Associate Professor of Clinical Nursing
Peter Coggiola, M.S., R.N., P.N.P., C (Rochester) Instructor of Clinical Nursing
Mary Collins, M.S., R.N. (Rochester) Clinical Nurse Specialist; Instructor of Clinical Nursing
Elizabeth Cooper, Ed.D., C.N.M. (Rochester) Assistant Professor, Director of Nurse Midwifery
Patricia Corbett-Dick, M.S., R.N. (Rochester) Nurse Practitioner; Instructor of Clinical Nursing
Wendy Cornell, M.S., R.N., C. (Rochester) Instructor of Nursing; Interim Clinical Chief
Rita D'Aoust, M.S., R.N. (Rochester)
Instructor of Clinical Nursing

Nancy Dehmler, M.S., R.N. (Rochester)
Instructor of Clinical Nursing

Carol Dwyer, M.S., R.N. (Aquinas)
Instructor of Nursing

Bevery Faro, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Assistant Professor of Clinical Nursing

Joanne Fioravanti, M.S., R.N. (Rochester)
Clinical Chief; Pediatric Nursing; Assistant Professor of Clinical Nursing

Mary Flannery, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Assistant Professor of Nursing

Kathleen Gaglione, M.S., R.N. (Rochester)
Nurse Educator; Instructor of Clinical Nursing

Jean Garling, EdD., R.N. (Rochester)

Theresa Madonna, M.S., R.N. (Michigan)

Bernadette Malaret, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Assistant Professor of Clinical Nursing

Linnda Jones, M.S., R.N. (Rochester)
Assistant Professor of Clinical Nursing

Dor Greene, M.S., R.N. (Rochester)
Assistant Professor of Clinical Nursing; Clinical Nurse Specialist

Suanne Miller Hickey, M.S., R.N. (Rochester)
Assistant Professor of Clinical Nursing; Nurse Practitioner

Donna Hill, Ph.D., R.N. (Rochester)
Assistant Professor of Nursing

Patricia Hinton-Walker, Ph.D., R.N. (Mississippi)
Associate Professor of Clinical Nursing; Associate Dean & Director of Community Centered Practice

Jeanne Grace, Ph.D., R.N. (Rochester)
Assistant Professor of Clinical Nursing

Hope Titlebaum, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Assistant Professor of Clinical Nursing

Charlotte Torres, Ed.D., R.N. (Rochester)
Coordinator, Undergraduate Studies; Assistant Professor of Nursing

Diane Warren, M.S.N., R.N. (Wayne State)
Nurse Educator; Instructor of Nursing

Noreen Pearsall, M.S., R.N. (Georgetown)
Clinical Nurse Specialist; Instructor of Clinical Nursing

Charlene Pope, M.S., R.N., C.N.M., M.P.M. (Maryland) 
Certified Nurse Midwife, Instructor of Clinical Nursing

Jill Quinn, M.S., R.N. (Rochester)
Nurse Practitioner; Instructor of Clinical Nursing

Alison Schulz, Ed.D., R.N. (Rochester)
Associate Professor of Clinical Nursing; Project Director, EPPM

Julie Szaszek, M.S., R.N. (Rochester)
Nurse Practitioner; Assistant Professor of Clinical Nursing

Elizabeth Slavinskas, M.S.N., R.N. (Buffalo)
Clinical Chief Emergency and Ambulatory Nursing; Instructor of Clinical Nursing

Toni Smith, Ed.D., R.N. (Rochester)
Assistant Professor of Nursing; Program Director, NP

Angeline Springer, M.S., R.N., C. (Rochester)
Instructor of Clinical Nursing; Nurse Practitioner

Hope Titlebaum, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Assistant Professor of Clinical Nursing

Mary Ellen Webb, M.S., R.N. (Rochester)
Instructor of Nursing; Clinical Nurse Specialist

Patricia Wittzel, M.S., M.B.A., R.N. (Rochester)
Assistant Professor of Clinical Nursing

Hannahl Yoo, M.S., R.N. (Rochester)
Assistant Professor of Nursing; Nurse Practitioner

ASSOCIATE FACULTY

Patricia Allen, M.S., R.N. (Rochester)
Clinical Associate; Nurse Practitioner

Mary Bazar, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

JoAnn Belle-Isle, M.S.N., R.N. (Pittsburgh)
Clinical Nurse Specialist; Clinical Associate

Susan Bezek, M.S., R.N. (Rochester)
Nurse Practitioner; Clinical Associate

Marie Biancuzzo, M.S., R.N. (Syracuse)
Clinical Nurse Specialist; Clinical Associate

Linda Boccardo, M.S., R.N. (Rochester)
Nurse Practitioner; Clinical Associate

Philip Bonannini, M.D. (Rochester)
Associate Professor; Clinical Associate Professor

Karen Bonhote, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Carroll Bouman, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Senior Associate

Margaret Bushey, M.S., R.N. (Rochester)
Clinical Associate; Clinical Nurse Specialist

Theresa Caffery, M.S., R.N. (Rochester)
Nurse Practitioner; Clinical Associate

Karen Chalanick, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Christine Charbonneau, M.S.PH. (UCLA) 
Clinical Associate

Marianne Chialfery, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Lisa Chormann, M.S., R.N. (Rochester)
Clinical Associate

Carol Cornwell, M.S., R.N., C.S. (Rochester)
Clinical Nurse Specialist; Senior Associate

Carol Crane, M.B.A., R.N. (Rochester)
Clinical Associate; Senior Associate

Phulene Cromwell, M.S., R.N. (Rochester)
Nurse Manager; Clinical Associate

Mariana Cutrone, M.S., R.N. (Rochester)
Nurse Practitioner; Clinical Associate

Laurie Damschke, M.S., R.N. (Rochester)
Nurse Manager; Clinical Associate

Karen Downey, M.S., R.N. (D'Youville)
Clinical Associate; Nurse Educator

Ann Marie Dozier, M.S., R.N. (Rochester)
Clinical Chief of Medical Nursing; Senior Associate

Irene Dutko, M.S., R.N. (Rochester)
Clinical Chief OB/GYN; Senior Associate

Tamara Eis, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Judith Fagen, M.S., R.N., C. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Mary Farren, M.S., R.N. (Rochester)
Clinical Chief Community Health Nursing; Senior Associate

Dawn Fasone, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Vickie Fieler, M.S., R.N. (Boston) 
Senior Associate; Clinical Nurse Specialist

Gloria Fluellen, M.S., R.N. (Rochester)
Clinical Associate; Nurse Practitioner

Maureen Freedman, M.S., R.N. (Rochester)
Clinical Associate; Nurse Practitioner

Meriel Friedman-Campbell, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Karen Frye, M.S., R.N. (Rochester) 
Clinical Associate

Suzanne Fullar, M.S., R.N. (Rochester)
Clinical Associate

Nina Gaby, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Bruce Gehring, M.S., R.N. (Rochester)
Nurse Manager; Clinical Associate

Leigh Griffiths, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate
Jennifer Harris, M.S., R.N. (Minnesota)
Clinical Associate; Nurse Practitioner

Darby Leyden, M.S., R.N. (Pittsburgh)
Clinical Nurse Specialist; Clinical Associate

Michelle Gullace, M.S.N., R.N. (Pittsburgh)
Clinical Nurse Specialist; Clinical Associate

Jennifer Harris, M.S., R.N. (Minnesota)
Clinical Associate; Nurse Practitioner

Anne Harris, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate

Denise Hartung, M.S., R.N. (SUNY Buffalo)
Clinical Associate; Nurse Manager

Susan Hauptfleisch, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Carol Henretta, M.S., R.N. (Rochester)
Clinical Associate

Denise Hartung, M.S., R.N. (SUNY Buffalo)
Clinical Associate

Mary Ellen Kunz, M.S., R.N. (Rochester)
Nurse Manager; Clinical Associate

Rita Chisholm, M.A., R.N. (Teachers College, Columbia)
Professor Emeritus of Nursing

Rita LeMoine, M.S., R.N. (Rochester)
Clinical Associate; Nurse Practitioner

Josephine Crotzer, M.S., R.N. (Rochester)
Professor Emeritus of Nursing

Linda Zeoli, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Darby Leyden, M.S., R.N. (Rochester)
Nurse Practitioner; Clinical Associate

Sonja Liberatore, M.S., R.N. (Buffalo)
Nurse Manager; Clinical Associate

Patricia Lind, M.S., R.N., C. (Rochester)
Director of Nursing Education/Research Development, SMH; Senior Associate

Linda Lord, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Barbara Lumsden, M.S., R.N., C. (Pittsburgh)
Nurse Practitioner, Clinical Associate

Lynne MacConnell, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Jean Mack-Fogg, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate

Karen Malone, M.C., R.N. (Ohio State)
Chief of Pediatrics; Senior Associate

Lauren Matlin, M.S., R.N., C. (Rochester)
Nurse Practitioner, Clinical Associate

Barbara Masulis, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Patricia McCabe, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate

Kathleen McGrath, M.S.N., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Donna Mueller, M.S., R.N. (Rochester)
Clinical Nurse Specialist, Clinical Associate

Susan Milshein, M.S., R.N. (Case Western Reserve University)
Clinical Associate

Margaret Murray, M.S., R.N. (Rochester)
Nurse Practitioner, Clinical Associate

Carrie Magee Nolan, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate

Lisa Norsen, M.S., R.N. (Rochester)
Clinical Nurse Specialist, Senior Associate

Janice Opladen, M.S., R.N. (Rochester)
Clinical Nurse Specialist, Senior Associate

Deborah Osterberg, M.S.N., R.N. (Bloomington)
Clinical Nurse Specialist; Clinical Associate

Barbara Outterson, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Cynthia Palenski, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate

Nancy Pedersen, M.S., R.N. (Rochester)
Nurse Practitioner; Clinical Associate

Sherry Pomeroy, M.S., R.N. (Rochester)
Clinical Associate

JoAnne Romano-Egan, M.S., R.N. (Rochester)
Clinical Nurse Specialist, Senior Associate

Marsha Pulhamus, M.S., R.N. (Rochester)
Clinical Nurse Specialist, Clinical Associate

Kathy Rideout, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Senior Associate

Janice Rogers, M.S., R.N. (Rochester)
Nurse Practitioner, Clinical Associate

JoAnn Romano-Egan, M.S., R.N. (Rochester)
Clinical Associate; Nurse Practitioner, Clinical Specialist

Carolyn Sammann, M.S., R.N., C.E.N. (Rochester)
Clinical Nurse Specialist; Senior Associate

Susan Saunders, M.S.W. (Missouri)
Director of Social Work, SMH; Assistant Professor of Psychiatry, Clinical Associate

Jaclyn Schultz, M.S., R.N. (Wisconsin)
Nurse Practitioner, Clinical Associate

Margaret Ann Schwalm, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Jeanette Shatraw, M.S., R.N. (Syracuse)
Clinical Nurse Specialist; Clinical Associate

Joanne Stevens, M.S., R.N., C. (Rochester)
Nurse Practitioner, Clinical Associate

Marilyn Sullivan, M.S., R.N., C.S. (Rochester)
Clinical Nurse Specialist, Clinical Associate

Margaret Tobin, M.S., R.N. (Rochester)
Clinical Associate

Mary Turner, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Elizabeth Vaczy, M.S., R.N. (Rochester)
Clinical Nurse Specialist; Clinical Associate

Bonnie Walden, M.S., R.N. (Rochester)
Clinical Associate

Suzanne Wall, M.S., R.N. (Rochester)
Nurse Practitioner, Clinical Associate

Laurel Walsh, M.S., R.N. (Rochester)
Nurse Practitioner, Clinical Associate

Roxanne Walder, M.S., R.N. (Rochester)
Nurse Manager; Clinical Associate

Susan Weidner, M.S., R.N., C. (Rochester)
Nurse Practitioner; Clinical Associate

Joyce Weidrich, M.S., R.N. (Rochester)
Clinical Associate

Vicki Weinstraun-Finnes, M.S.N., R.N. (Rochester)
Clinical Associate; Clinical Nurse Specialist

Jean Welch, M.S., R.N. (D’Youville)
Clinical Associate; Clinical Nurse Specialist

Jennifer Willison, M.S., R.N. (Rochester)
Clinical Nurse Specialist, Clinical Associate

EMERITUS FACULTY

Rita Chisholm, M.A., R.N. (Teachers College, Columbia)
Professor Emeritus of Nursing

Loretta Ford, Ed.D., R.N. (Colorado)
Dean Emeritus of Nursing

Eleanor Hall, M.A., R.N. (Columbia)
Professor Emeritus of Nursing

Elaine Hubbard, Ph.D., R.N., C. (Boston)
Professor Emeritus of Nursing

Helen McNerney, M.S., R.N. (Rochester)
Professor Emeritus of Nursing

Edith Olson, M.S., R.N. (Hunter)
Professor Emeritus of Nursing

Rose Pinneo, M.S., R.N. (Pennsylvania)
Professor Emeritus of Nursing

Mary Wemett, M.S., R.N. (Rochester)
Professor Emeritus of Nursing
The mission of the School of Nursing is to prepare nurses to meet the challenges of health care today and into the twenty-first century. Our philosophy includes beliefs about nursing, nurses, consumers, environments, health, unification, and the educational process.

We believe the profession of nursing has as its essence assisting people to attain and maintain optimal health and to cope with illness and disability. Nursing derives its rights and responsibilities from society and is, therefore, accountable to society as well as to the individuals who comprise it. The nurse functions as a caring professional in both autonomous and collaborative professional roles, using critical thinking, ethical principles, effective communication and deliberative action to render holistic care, facilitate access to health care, and aid consumers in making decisions about their health.

The consumer of nursing care may be an individual, family, group, community, or society, who all have diverse and changing needs. We believe the consumer is self-determining and has the right to informed choice about health. All actual consumers and potential consumers, including those who are disenfranchised from the health care system, have the right of access to health care.

Environment has a significant impact on health. Any setting in which consumers function is an appropriate environment for nursing practice. Nurses must be active in social, political, and economic arenas to shape policy that creates optimal environments for maximizing health.

Health is a subjective state which includes well-being, optimal functioning in all dimensions of life: biological, psychological, social, cultural, and spiritual; effective response to a continually changing environment; and achievement of personal potential. Health is affected by illness, disability, and dysfunction. Consumers ultimately define health for themselves and make decisions regarding it.

At the School of Nursing, faculty and learners function from the perspective of the Unification Model. Nursing practice, education, and research are the three interdependent elements of this model, each element enhancing the others. Unification embodies both a philosophical approach and an organizational structure which promotes and facilitates faculty practice and strengthens operational interdependence among practice, education, and research. Research strengthens education and practice through development of the nursing knowledge base. Practice enriches both research, through generation of questions, and education, through continual application of scientific knowledge. Education empowers nurses for leadership in professional practice and research. The interaction of these elements benefits the consumer through enhancement of the quality of nursing care.
The educational climate of the School of Nursing enhances respect, collaboration, and support among learners and faculty. Learners in the School of Nursing study the scientific and theoretical dimensions of their discipline in the context of a strong liberal arts background. A rigorous professional education with the breadth and perspective of the arts and sciences prepares leaders in nursing who shape current and future responses to ethical, political, economic, health, and nursing issues. Critical thinking and decision making are basic to the delivery of health care. Consistent with the University's mission, the School of Nursing fosters individuality, self-direction, scholarship, and commitment to lifelong learning. Continued professional learning opportunities assist nurses in developing professional expertise. Creative, flexible programming in education is essential to meet the diverse and changing needs of both the learners and the nursing profession.

Programs of the School of Nursing are registered with the State Education Department of the State of New York. All programs are accredited by the National League for Nursing. Graduates are eligible to take the licensing examination for Registered Nurse in New York State or any of the 50 states; likewise, they also are eligible for membership in nursing organizations such as the American Nurses' Association, the National League for Nursing, Sigma Theta Tau (the nursing honor society), and others, including specialty groups.

**REQUIREMENTS FOR THE DEGREE BACHELOR OF SCIENCE**

Freshmen declaring an intended major in nursing complete a pre-nursing program in the College of Arts and Science during their first two years. They enroll in the School of Nursing for the professional nursing program during their junior and senior years. A car is necessary to provide the student access to a full range of clinical opportunities.

Students may declare a concentration in nursing at any time. Students desiring to transfer to the School of Nursing at the junior level must have completed a minimum of two years of specified liberal arts and science education at either the University of Rochester or another college or university. Students interested in transferring into the School of Nursing, see page 199 of this bulletin.

Students are assigned nursing faculty advisors when they are admitted to the University or as soon as they declare nursing as a major concentration. The advisors assist students in planning an academic program to fulfill graduation requirements; counsel students concerning coursework, clinical experiences, and progression in the program; and provide resource information as needed by the individual student.

In addition to the specific courses stipulated in the degree program, students must satisfactorily complete the following:

1. A minimum total of 128 semester hours, or equivalent, of acceptable and satisfactory academic work.
2. A cumulative grade-point average of at least 2.0 for all courses taken for credit at the University of Rochester.
3. A minimum of 32 hours of coursework at the School of Nursing.

For registered nurses, a minimum of 32 hours of specified nursing coursework must be completed in the School of Nursing to fulfill the residency requirement. This requirement, as well as other degree requirements outlined above, may be completed on a full- or part-time basis within a six-year period, for a minimum total of 128 credits overall. Additional information about the nursing curriculum may be obtained by contacting: Student Affairs Office, University of Rochester School of Nursing, Box HWH, 601 Elmwood Avenue, Rochester, N.Y. 14642, (716) 273-2375.

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**Bachelor's Degree cum Laude, Magna cum Laude, and Summa cum Laude**

The School of Nursing recognizes outstanding achievement of its students by awarding these degrees.

The GPA levels used in determining honors are:

- **Summa cum laude** — 3.8 and above
- **Magna cum laude** — 3.5-3.79
- **Cum laude** — 3.3-3.49

**Pre-Nursing Program**

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<tr>
<td><strong>Freshman Year</strong></td>
<td><strong>Hours</strong></td>
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<tr>
<td>CHM 103. General Chemistry I</td>
<td>4</td>
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<td>ENG 103. Writing and Thinking</td>
<td>4</td>
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<tr>
<td>Free Elective</td>
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<tr>
<td>SOC 101. Introduction to Sociology</td>
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<td>PSY 101. Introduction to Psychology</td>
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<td>Humanities Elective</td>
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<tr>
<td>NUR 101. Health Care in a Changing Society (elective)</td>
<td>4</td>
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<td>Free Elective</td>
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<td><strong>Sophomore Year</strong></td>
<td><strong>Hours</strong></td>
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<tr>
<td>NUR 212. Anatomy and Physiology I</td>
<td>4</td>
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<tr>
<td>NUR 220. Human Growth and Development Through the Life Span</td>
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<td>STT 145 or 211.</td>
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<td>Humanities Elective</td>
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<td>NUR 213. Anatomy and Physiology II</td>
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<td>NUR 209. Microbiology</td>
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<td>Free Elective</td>
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<td>Free Elective</td>
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<tr>
<td><strong>Professional Nursing</strong></td>
<td><strong>Hours</strong></td>
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<tr>
<td>NUR 290. Communication with Individuals, Families, and Groups</td>
<td>4</td>
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<td>NUR 301. Research in Nursing</td>
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<td>NUR 362. Comprehensive Health Assessment of the Individual</td>
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<td>NUR 210. Nutrition</td>
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<td>NUR 214. Pharmacology</td>
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<td>NUR 291. Professional Nursing I</td>
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<td>NUR 218. Pathophysiology</td>
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A combined baccalaureate-master's degree program in nursing is available for select registered nurses with defined career goals. NUR 360, 361, 362, 294, and 6 credits of electives constitute the 22 credits required in undergraduate nursing courses for the students admitted to the R.N./B.S./M.S. program.

**Courses of Instruction**

The following list gives a general indication of the courses that have been offered in the past academic year. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

101. Health Care in a Changing Society. Credit—4 hours. This course provides an introduction to health care through exploration of current societal health issues. Emphasis is placed on individual choice and options available in relation to such topics as lifestyle, environmental factors, genetic endowment, and health services. Nursing and other health care providers' roles in creating new responses to health care issues are explored. Prerequisites: none. (Spring)

209. Microbiology. Credit—4 hours. This course introduces principles of general microbiology with major emphasis on control of microorganisms by physical and chemical processes. Medical microbiology focusing on pathogenicity; epidemiology of infectious diseases and immunology is included. (Spring)

210. Nutrition in Health and Illness. Credit—4 hours. Course content includes study of normal nutritional requirements as well as therapeutic nutrition in selected disease processes. Biochemistry provides the foundation for understanding the science of nutrition. Research on the relationship between nutrition and health and illness is discussed, with an emphasis on the prevention of nutrition-related diseases. Multicultural eating patterns are addressed. Prerequisites: none. (Spring)

212–213. Human Anatomy and Physiology I & II. Credit—8 hours. A two-semester, sequenced offering which provides a broad examination of human anatomy and physiology. Intended as a basis for further study in the basic sciences or health care fields; appropriate for students with a variety of interests. Prerequisite: CHM 103. (Fall and spring)

214. Pharmacology. Credit—4 hours. This course includes principles of enzyme kinetics, nuclear chemistry, and a basic knowledge of the major classes of drug actions upon various systems of the human body. Principles of drug absorption, distribution, metabolism, and elimination are included. Pharmacodynamics, mechanisms of drug action, pharmacologic effects, therapeutic uses, drug interactions, and nursing implications are also discussed. Prerequisites: CHM 103 or equivalent, NUR 209, NUR 210, NUR 212–213. (Spring)

218. Pathophysiology. Credit—4 hours. This course focuses on the physiologic changes that occur as a result of disease processes and the clinical manifestations indicative of altered health. It integrates anatomy, chemistry, microbiology, and physiology, and focuses on their application to clinical practice. Prerequisites: CHM 103 or its equivalent, NUR 212–213, NUR 209, or with written permission of instructor. (Fall)

220. Growth and Development through the Life Span. Credit—4 hours. This introductory course focuses on selected psychologic, biologic, and sociologic bases of human development. Content includes basic developmental issues beginning with conception and ending with death. Various research and theories pertaining to human development are presented. Students actively engage in projects that promote abilities to assess the development of individuals through the life span. Prerequisites: none. (Spring)

290. Communication with Individuals, Families, and Groups. Credit—4 hours. This course provides an introduction to communication and its therapeutic application with consumers of health care. Content includes communication with individuals, families, and groups; the therapeutic relationship; and teaching/learning principles. Communication in a multicultural context is emphasized. Application of current research is included. Opportunities to observe nurses in effective communication roles is provided as clinical observational experience. Prerequisites: none. (Fall)

291. Professional Nursing Care I. Credit—8 hours. This is the first of five sequential courses that integrate the concepts of consumer, nursing, health, illness, and environment. The course is designed to teach basic nursing concepts, nursing skills, and the nursing process. It provides the opportunity to use this learning in the care of culturally diverse consumers and their families experiencing alterations in health in a variety of settings, e.g., acute care, ambulatory, long-term care, home. Prerequisites: NUR 290, NUR 218, NUR 214 (co-requisite), NUR 290. (Spring)

292. Professional Nursing Care II. Credit—8 hours. This is the second of five sequential courses that integrate the concepts of consumer, nursing, health, illness, environment,
critical thinking, and professional role development in the care of culturally diverse consumers and their families experiencing complex health problems. It provides opportunities to deliver comprehensive nursing care and to collaborate with the health team and to implement transition to health settings, e.g., ambulatory, long-term care, acute care. Prerequisite: NUR 291. (Fall)

293. Professional Nursing Care III: Psychiatric Mental Health Nursing. Credit—4 hours. This course is the third of five sequential courses that integrate the concepts of consumer, environment, change, health, and illness. Individuals, families, and groups are the focus of nursing assessments and interventions directed toward the promotion of mental health and the treatment, rehabilitation, and prevention of mental illness. Throughout the course, the role of the psychiatric nurse is examined. Students have the opportunity to engage with clients and families and to interact with interdisciplinary teams in providing quality care. Prerequisite: NUR 292. (Spring)

294. Professional Nursing Care IV: Community Health Nursing. Credit—4 hours. This is the fourth of five sequential clinical courses that integrate the concepts of consumer, nursing, health, illness, and the environment. It provides didactic and clinical instruction in public health and community health nursing concepts. Students are placed in a certified home health agency where they provide nursing care and case management to individuals and their families, using principles of primary, secondary, and tertiary prevention. Students have an opportunity to explore the expanding roles of community health nurses in a variety of settings. For clinical assignments, students are required either to provide their own personal transportation or to use public transportation, at their expense. Prerequisite: NUR 292. (Fall, spring, and summer)

295. Professional Nursing Care V. Credit—4 hours. This course is the final in a series of five sequential courses that integrate the concepts of consumer, environment, change, health, and illness. It is designed to provide students with opportunities to demonstrate critical thinking in delivering comprehensive nursing care in a clinical setting of their choice, and to apply theories of leadership in practice. It is a culmination course linking the formal academic program to professional nursing practice. Prerequisites: NUR 293, NUR 294, NUR 306, NUR 365 (Spring)

301. Nursing Research. Credit—4 hours. This course provides an introduction to methods in nursing research. Students acquire a familiarity with the process of scientific inquiry and the application of quantitative and qualitative research to the development of nursing knowledge. Contributions of research to the practice of nursing are introduced. Prerequisite: Statistics. (Fall)

306. Professional Issues in Nursing. Credit—4 hours. This course emphasizes critical analysis of trends and societal and health issues that influence the nursing profession. A personal philosophy of nursing is developed. Prerequisites: none. (Fall and summer)

307. Epidemiology of Health Care. Credit—2 hours. This course uses an epidemiological framework to provide an overview of health-promotion and disease-prevention strategies throughout the life span. The meaning of health is examined within historic, cultural, social, personal, scientific, and philosophic contexts. The role of the nurse in promoting health with individuals, families, and communities is examined and analyzed. Prerequisites: none. (Fall)

360. Concepts and Process of Professional Nursing. Credit—3 hours. This course introduces the R.N. student to an examination of concepts, theories, and philosophies integral to nursing. Lecture/seminar format provides a forum for presentation and discussion of topics including professional role development, motivation for pursuing advanced nursing education, nursing as a science, and frameworks for nursing practice. (Fall and spring)

361. Delivery of Professional Nursing. Credit—3 hours (8 clinical hours per week). This is a clinical course for R.N.s that focuses on the application of theories and conceptual models in the delivery of professional nursing. Students are expected to demonstrate use of critical thinking as they provide comprehensive nursing care to patients and their families directed to the promotion, restoration, and retention of health and/or comfortable, dignified death. Prerequisite: NUR 360. (Spring)

362. Comprehensive Health Assessment of the Individual. Credit—4 hours. This course builds on previous courses in the biopsychosocial sciences and focuses on techniques of physical assessment, psychosocial assessment, interviewing, and history taking. Differentiation of regional versus comprehensive examination is emphasized. The course is designed to enable students to describe findings and to differentiate normal from atypical or abnormal. Problem-solving skills are developed through the analysis of assessment data. Prerequisites: NUR 212–213. (Fall and summer)

365. Clinical Nursing Leadership. Credit—2 hours. This course comprehensively examines the roles and responsibilities of the first-line nurse manager within the health care system. Complex organizations are reviewed within the context of leadership and management theories. Prerequisite: NUR 292. (Fall, spring, and summer)

Nursing Electives
271. Coping With Loss and Change
280. Perioperative Nursing
282. Critical Care Nursing
328. Transcultural Nursing
330. Nursing and the Humanities
332. Introduction to International Health
333. Interdisciplinary Management of Pain
Although undergraduate degrees in business are not offered, the William E. Simon Graduate School of Business Administration cooperates with other University divisions in offering the 3-2 program, through which a student can earn in five years, instead of the usual six, a bachelor's degree in his or her undergraduate concentration and a Master of Business Administration degree.

THE 3-2 PROGRAM
LEADING TO A B.A. AND AN M.B.A.
The Simon School cooperates with other University of Rochester colleges—and other colleges and universities—in offering a combined undergraduate and graduate degree program. The 3-2 M.B.A. Program allows students to earn both a bachelor's degree in an undergraduate major and a Master of Business Administration degree in five years, rather than the traditional six.

Students in the 3-2 program study for three years in their undergraduate major and complete major and distributive course requirements. Between January and March of their junior year, qualified students apply for admission to the Simon School. After acceptance, they take the first year of the M.B.A. program, rather than the traditional "elective" senior-year courses.

At the end of that year, 3-2 students should receive a bachelor's degree in their undergraduate major. They then complete the Simon School M.B.A. in one additional year.

3-2 PROGRAM FACTS
- A bachelor's degree and an M.B.A. degree are earned in five years.
- The program maintains all of the full-time M.B.A. program requirements.
- Admission to the 3-2 program is limited and is offered only to exceptionally well-qualified students.
- Students may enter in September or January.
- Some undergraduate preparation in economics, mathematics, or statistics is desirable but not required.
- Application to the 3-2 program is made during the junior year of the undergraduate degree program.

3-2 PROGRAM ADMISSION REQUIREMENTS
The 3-2 program requirements are the same as for the full-time M.B.A. program.

Applicants must
- have achieved outstanding scholarship in their first two and a half years of undergraduate study;
- have considered or have completed a business internship prior to commencing the M.B.A. program;
- have obtained their undergraduate department's permission to enter the 3-2 program;
- have scored well on the Graduate Management Admission Test (which they should take by January of their junior year);
- have interviewed with a member of the Simon School's Admissions Office staff.

Transfer students may apply for admission to the 3-2 program after completing two and a half years of study at another institution. Students should make certain their undergraduate school will accept the first year of the M.B.A. program as completion of the requirements for the bachelor's degree. Other admission requirements are the same as those for University of Rochester students.

3-2 PROGRAM CURRICULUM
Students in the 3-2 program must meet the requirements of, and take the same core courses listed for, the full-time M.B.A. program. Students are also required to pass the management-communication sequence, and the same options are available for concentrations and electives. The M.B.A. curriculum consists of 10 required core courses, nine required electives, a capstone course, and a management-communication sequence.

THE CORE
The core curriculum is taken during the first three quarters. Students who enter the M.B.A. program in September take the core curriculum in the fall, winter, and spring quarters. Students who enter the M.B.A. program in January take the core curriculum in the winter, spring, and summer quarters. During the first three quarters, students complete the 10 required courses, an internship elective, and the management-communication sequence.

The core curriculum provides a comprehensive general business education and serves as the foundation for advanced study in selected areas of concentration. The core curriculum is comprised of the following 10 courses:

- ACC 401, Essentials of Accounting;
- O&M 401, Managerial Economics;
- APS 401, Probability and Decision Analysis;
- CIS 401, Information Systems for Management;
- APS 402, Data Analysis and Forecasting;
- FIN 402, Capital Budgeting and Corporate Objectives;
- OMG 402, Operations Management;
- MKT 402, Marketing Management;
- MSM 403, Structuring Management Decisions;
- O&M 403, Organization Theory.

A two-course Management-Communication Sequence comprised of GBA 401, Presentation Skills, and GBA 402, Business Writing and Editing, is also required.

Concentrations and Electives
Elective courses in each of the 11 areas of concentration are devoted to applying, implementing, and integrating the principles learned in earlier courses. Students must complete at least one concentration in a functional area of business, as follows:

- Accounting and Information Systems
- Corporate Accounting
- Public Accounting
- Computers and Information Systems
- Finance
- Marketing
- Operations Management
- Organizations and Markets
Many students choose to complete concentrations in more than one of the functional areas listed above. In addition, students may choose to complete the Business Environment and Public Policy concentration, which must be taken in conjunction with another functional-area concentration.

Interdisciplinary concentrations in Entrepreneurship and International Management are also offered. These are broad in focus, apply material from the functional areas of study, and must be taken in conjunction with at least one of the functional-area concentrations listed above.

Courses from other schools and colleges of the University may also be taken, with M.B.A. Program Committee approval, when related closely to the student’s area(s) of concentration.

APPLICATION INFORMATION
Priscilla Gumina
Assistant Dean for M.B.A. Programs
William E. Simon Graduate School of Business Administration
Schlegel Hall
Rochester, New York 14627
(716) 275-3533

CONCENTRATIONS
Accounting and Computers and Information Systems
In response to the automation of major accounting functions in organizations, the Simon School has designed an integrated concentration in computers and information systems and accounting which provides thorough training in both areas.

Corporate Accounting
The corporate accounting major is actively recruited by corporations for positions in controller’s, treasurer’s, and internal auditing offices, as well as in accounting departments.

Public Accounting
This concentration meets the educational requirements of the State of New York for admission to the Uniform Certified Public Accounting Examination used by all states and has been registered with and approved by the Division of Professional Education, New York State Education Department.

Business Environment and Public Policy*
This concentration provides students with the skills to understand the economic environment in which a firm operates for business success.

Computers and Information Systems
The computers and information systems concentration prepares graduates for management responsibilities in using computer systems and will enable them to provide organizations with successful management information systems.

The Entrepreneurship Concentration*
The Simon School is committed to the teaching of entrepreneurship. The Entrepreneurship concentration allows the student to draw from a variety of carefully selected courses to become a business generalist who is well versed in organizing and managing resources.

Graduates with this concentration have started their own ventures or have pursued "entrepreneurial" careers with major corporations. Students often combine this concentration with Finance or Marketing to further enhance their educational base.

Finance
This concentration provides students with state-of-the-art techniques for financial analysis. Students learn to formulate and solve important corporate finance problems and learn to obtain information from the many data bases on financial markets.

The International Management Concentration*
The International Management concentration gives students opportunities to apply various disciplines to international markets. Differences in legal environments, currencies, and workplace practices among countries provide both challenges and problems for businesses operating in the global marketplace.

There are two options for satisfying the concentration. The first involves one required course, one elective, and one term (minimum of six credits) in an approved international exchange program.

Marketing
The marketing concentration continues to be a strong area of opportunity for graduates with an M.B.A. The concentration gives students excellent preparation for marketing research, marketing consulting, and product management.

Operations Management
Operations management is concerned with the managerial decisions by which a firm allocates and utilizes its physical, financial, and human resources to produce goods or services. The resurgence of interest in operational productivity has reinforced the demand for M.B.A.s with the ability to analyze resource management problems in manufacturing and service firms.

Organizations and Markets
This concentration focuses on the theory of the firm, also popularly referred to as price theory. There is a growing recognition that understanding the economics of corporate behavior is essential to managers for making sound business decisions. This concentration provides students with a solid foundation of this discipline.

RESEARCH ACTIVITY
Research activity at the Simon School includes independent research conducted by faculty and graduate students and other studies carried out at the School's research centers.

The Bradley Policy Research Center was established in 1966 to investigate the impact of government policy on business firms. The center has been recently reorganized to encompass two separate programs of research:

• Macroeconomic Research and Government Policy: This program supports research on topics such as business cycles, economic forecasting, monetary and fiscal policy-making, industrial organization, antitrust policy, industrial regulation, and privatization of public corporations.

• Financial Research and Policy: This program supports the study of economics and regulation of the market for corporate control, corporate finance, executive compensation, financial markets, and regulation.

The Center for Manufacturing and Operations Management is concerned with the management problems that confront manufacturing and service managers today. The focus is on reintegrating the manufacturing and operations functions into corporate strategy and developing a scientific understanding of manufacturing and service operations to provide line managers with a sound basis for decision making.

THE MANAGEMENT LIBRARY
The Management Library, located on the third floor of Rush Rhees Library, has seating for 160, carrels and open study areas for 88 graduate students, and six research study rooms. In addition, the adjoining fourth-floor stacks house 50 student carrels and 32 studies.

The University libraries overall have resources of over two million volumes, and Rush Rhees Library is a depository for United States and New York State documents. It regularly receives more than 10,500 periodicals and
serials, of which over 2,000 relate to management. The main library collections on business and economics (about 100,000 volumes) are adjacent to the Management Library. With the help of two librarians, 10 to 12 student assistants, and clerical staff, the management librarian maintains extensive collections of reference, research, and reserve materials for the Simon School's use, including management, business, and economics periodicals. Corporate annual reports are available for approximately 6,000 companies. A special geographical file is maintained on economic conditions, along with an industry file of statistics and trends and a large file of research reports and working papers from other institutions.

**THE SIMON SCHOOL COMPUTING CENTER**

The objective of the Simon School Computing Center is to provide high-quality computing services to the students, faculty, and staff of the Simon School. This objective is accomplished through investments in equipment, software, and personnel supporting all academic and administrative computing. The major emphasis of the center is placed on the delivery and support of computing services rather than simply providing a collection of hardware and software.

The center operates a Hewlett-Packard 3000 Series 68 which satisfies much of the School's administrative computing needs. Students use the HP 3000 to interact with the Student System, the School's on-line registration and student-record system. An IBM 4381, Model P24 is used to support faculty research as well as some academic coursework. Several programming languages, statistical and mathematical programming packages, and document processors are available on these machines for student use.

The center has two facilities which house over 40 IBM-compatible and 30 Macintosh microcomputers. Most of these micros are connected to a local-area network which supports mainframe access, file exchange, and shared printing; all of them have access to laser printers for high-quality output. First-year M.B.A. students usually acquire student versions of popular productivity software for use in the center; for example, Lotus 1-2-3 will be used in CIS 401 for the 1992–93 academic year. The center maintains a library of microcomputer software for student use, including spreadsheets, word processors, programming languages, and other special-purpose packages.

The facilities are usually open to students 16 hours a day, seven days a week, during the academic year and are continuously staffed with a consultant to assist students with their computing needs.

**THE PLACEMENT OFFICE**

The Simon School maintains its own Placement Office, specifically designed to serve M.B.A. students and employers. The mean starting salary offered to 1992 M.B.A. graduates was $50,914. The Placement Office organizes a broad array of programs, including career seminars, a weekly noncredit career course, and frequent guest speakers from a variety of firms. It also operates a New York Recruiting Program in which firms that have not recruited on campus are invited to interview students in New York City.

The Simon School is a member of the M.B.A. Consortium, a group of 13 leading business schools that holds recruiting events in cities across the United States.

**COURSES OF INSTRUCTION REGULARLY OPEN TO UNDERGRADUATES**

The following list gives a general indication of the courses that have been offered in the past academic year, and, in some cases, courses that are new for 1993–95. Some courses are offered only in alternate years. Definitive course listings are distributed prior to registration.

The following courses are offered in both the day and evening sessions and are available to full- and part-time undergraduate students.

**ACCOUNTING**

201. Principles of Accounting. An introduction to the principles and procedures employed in analyzing business transactions, recording their financial effects, summarizing them in financial statements, and interpreting these statements. Not open to freshmen.

221. Cost Accounting. Study of the accounting problems involved in determining, analyzing, and controlling production and distribution costs, and income determination for financial statements. Budgetary control, standard costs, and other topics are discussed from the viewpoint of management use in planning and control. Prerequisite: ACC 201.

**FINANCE**

205. Financial Management. This course provides a market-oriented framework for analyzing the major types of financial decisions made by corporations. Discounted cash-flow techniques are introduced and applied to the capital budgeting problem (the choice among alternative investment projects) and financial asset valuation. Security markets are discussed and topics of capital market efficiency and portfolio theory are introduced. The effects of capital structure and dividend policy on the value of the firm are analyzed. Prerequisites: ACC 201; ECO 207 or equivalent.

**GENERAL BUSINESS ADMINISTRATION**

157. Fundamentals of Business Administration. An introduction to the principal activities, responsibilities, types of policy problems, and interrelationships of the main phases of business, including personnel, production, marketing, and finance. Frequent use is made of business cases for illustrative purposes and to introduce the student to the method of business problem analysis. Not open to freshmen.

**BEHAVIORAL SCIENCES IN INDUSTRY**

241. Fundamentals of Personnel Administration. A survey of all aspects of human resources. Topics include strategic planning, staffing, training and development, compensation, benefits, health and safety, employee and union relations, and laws governing how organizations must treat people. Open to juniors and seniors only.
LAW
205. Business Law. A study of basic principles in several fields of law of significance to businesses and other organizations, including constitutional law, contracts, and business torts. This is preceded by a review of certain environmental and historical aspects of the law, including the legal processes by which our laws are created, and the functions of the courts. Throughout, the emphasis is on developing an understanding of the reasoning process used by the courts to resolve disputes and define new law. Open to juniors and seniors only.

MARKETING
203. Marketing. Problems involved in the movement of goods from producers to consumers and industrial users through the different channels of distribution. Analysis of the marketing functions performed by manufacturers, wholesalers, retailers, agent middlemen, and market exchanges. Critical analysis of major marketing policies. Evaluation of such topics as pricing, branding, choice of distribution channels, selective selling, and the planning and administration of sales programs. Not open to freshmen.

213. Marketing Projects and Cases. This course concentrates on the practical application of sound marketing principles. The specific business situations involve the student in analyzing the available information and in developing appropriate marketing plans. Recommendations regarding prices, communications, and distribution channels are evaluated against the context of customer needs and competitive positions. Practical guidelines for analyzing problems and for creating plans are developed involving cases, guest speakers, readings, lectures, and projects.

OPERATIONS MANAGEMENT
231. Operations Management. The course discusses problems encountered in managing the production of goods and services, and models and techniques for dealing with these problems. Emphasis is on developing analytic insight into selected models which have proved useful. Topics include strategy and tactics, decision theory, forecasting, production management, material planning, project planning, and quality control. Video presentations and case discussions are also included to gain practical insights into the operations function. Not open to freshmen.
Margaret Warner  
Graduate School of 
Education & 
Human Development

Philip Wexlet, Ph.D. (Princeton)  Dean

PERSPECTIVES ON EDUCATION
Undergraduates who would like to know more about education and schooling are encouraged to study in the Margaret Warner School of Education and Human Development. Issues such as the role of schooling in political socialization; the application of psychological theory and research to human learning and development; the ties among economic, social, and educational policies; the relations among race, gender, language, ethnicity, and class and schooling; the historical and philosophical foundations of teaching and learning; the uses of technology in human growth and development; and other matters of significance to contemporary society may be studied as part of work in other colleges of the University. A wide range of classes, seminars, field work, and independent study is available.

It is also possible to explore (and even begin specific careers) through the Warner School as an undergraduate. Students are encouraged to talk with any member of the School's faculty. General questions may also be directed to the Office of Academic Services, 304 Lattimore Hall, (716) 275-3950.

PREPARING FOR SECONDARY SCHOOL TEACHING
The Secondary Teacher Education Program is a joint program of the College of Arts and Science and the Warner School of Education and Human Development leading to certification (grades 7-12) in English, social studies, mathematics, modern foreign languages, and the natural sciences—biology, chemistry, physics, earth science, and general science.

Students must complete six education courses, student teaching, and a workshop on child abuse. Students must also complete the New York State Teacher Certification Examination.

Application for admission to the Secondary Teacher Education Program should be made during the first semester of the junior year. Because New York State certification requirements do not necessarily coincide with the University's degree requirements, students considering a career in teaching should discuss their plans with a College of Arts and Science faculty advisor and a Warner School subject area specialist as soon as possible.

ADMISSION REQUIREMENTS
1. Junior standing and evidence, including good academic standing, that certification and bachelor's degree requirements will have been completed by the end of the senior year.
2. A grade-point average of 2.5 or higher in the field selected for student teaching and an overall grade-point average of 2.0 or higher.

APPLICATION PROCEDURE
The following steps must be taken by students seeking admission:
1. Obtain instruction and application form from the Office of Academic Services, 304 Lattimore Hall, early in the first semester of the junior year.
2. Return completed application to the Office of Academic Services and receive interview assignments.
3. Meet with the assigned faculty advisors for interviews and (following admission) preliminary program planning.
4. Enroll, at the next regular registration, in the courses selected in conference with the assigned faculty advisors.

For applications and further information, contact the Office of Academic Services, 304 Lattimore Hall, (716) 275-3950.

FIFTH YEAR IN TEACHING PROGRAM
Recognizing the critical national, state, and local need for minority teachers, the University of Rochester has begun a unique program to encourage its minority undergraduates to enter the field of teaching. This program, Fifth Year in Teaching, provides full tuition to African-American, Native American, and Latino University of Rochester graduates who are U.S. citizens or permanent residents. Students apply during the senior year and are accepted for full-time graduate study in the Warner School's Master of Science or Master of Arts in teaching degree programs leading to certification in teaching. Scholarships covering the cost of on-campus room and board are available for students with financial need; university loans (forgivable after one year of teaching) are available for students who are not eligible for room-and-board scholarships. Graduates of this program are obligated to teach for one year in an urban school in the United States. For applications and further information, contact the Office of Academic Services, 304 Lattimore Hall, (716) 275-3950.

THE 3-2 PROGRAM IN HUMAN DEVELOPMENT
The 3-2 program offers an opportunity for qualified students to begin graduate study toward the Master of Science degree during their senior year, and to complete the master's program in one year of postgraduate study. Students may concentrate in research in psychological development or school counseling.

In the first year of the 3-2 program, students finish their undergraduate program and receive the bachelor's degree in their undergraduate concentration at the end of the senior year; they are simultaneously enrolled in the master's degree program, completing 15 credit hours of graduate coursework that are part of credit-hour requirements for both degrees. In the second year, the final graduate hours are devoted to coursework in the student's area of concentration. A master's thesis is required for research in psychological development and school counseling.

ADMISSION REQUIREMENTS
1. Junior standing, with a grade-point average of approximately 2.8 or higher.
2. Evidence that the student's undergraduate concentration will be completed by the end of the junior year, or assurance from the concentration department that requirements for the bachelor's degree will be met by the end of the senior year.
Although undergraduate degrees in business are not offered, the William E. Simon Graduate School of Business Administration cooperates with other University divisions in offering the 3-2 program, through which a student can earn in five years, instead of the usual six, a bachelor's degree in his or her undergraduate concentration and a Master of Business Administration degree.

**THE 3-2 PROGRAM LEADING TO A B.A. AND AN M.B.A.**

The Simon School cooperates with other University of Rochester colleges—and other colleges and universities—in offering a combined undergraduate and graduate degree program. The 3-2 M.B.A. Program allows students to earn both a bachelor's degree in an undergraduate major and a Master of Business Administration degree in five years, rather than the traditional six.

Students in the 3-2 program study for three years in their undergraduate major and complete major and distributive course requirements. Between January and March of their junior year, qualified students apply for admission to the Simon School. After acceptance, they take the first year of the M.B.A. program, rather than the traditional "elective" senior-year courses.

At the end of that year, 3-2 students should receive a bachelor's degree in their undergraduate major. They then complete the Simon School M.B.A. in one additional year.

**3-2 PROGRAM FACTS**

- A bachelor's degree and an M.B.A. degree are earned in five years.
- The program maintains all of the full-time M.B.A. program requirements.
- Admission to the 3-2 program is limited and is offered only to exceptionally well-qualified students.
- Students may enter in September or January.
- Some undergraduate preparation in economics, mathematics, or statistics is desirable but not required.
- Application to the 3-2 program is made during the junior year of the undergraduate degree program.

**3-2 PROGRAM ADMISSION REQUIREMENTS**

The 3-2 program requirements are the same as for the full-time M.B.A. program.

Applicants must
- have achieved outstanding scholarship in their first two and a half years of undergraduate study;
- have considered or have completed a business internship prior to commencing the M.B.A. program;
- have obtained their undergraduate department's permission to enter the 3-2 program;
- have scored well on the Graduate Management Admission Test (which they should take by January of their junior year),
- have interviewed with a member of the Simon School’s Admissions Office staff.

Transfer students may apply for admission to the 3-2 program after completing two and a half years of study at another institution. Students should make certain their undergraduate school will accept the first year of the M.B.A. program as completion of the requirements for the bachelor's degree. Other admission requirements are the same as those for University of Rochester students.

**3-2 PROGRAM CURRICULUM**

Students in the 3-2 program must meet the requirements of, and take the same core courses listed for, the full-time M.B.A. program. Students are also required to pass the management-communication sequence, and the same options are available for concentrations and electives. The M.B.A. curriculum consists of 10 required core courses, nine required electives, a capstone course, and a management-communication sequence.

**THE CORE**

The core curriculum is taken during the first three quarters. Students who enter the M.B.A. program in September take the core curriculum in the fall, winter, and spring quarters. Students who enter the M.B.A. program in January take the core curriculum in the winter, spring, and summer quarters. During the first three quarters, students complete the 10 required courses, an internship elective, and the management-communication sequence.

The core curriculum provides a comprehensive general business education and serves as the foundation for advanced study in selected areas of concentration. The core curriculum is comprised of the following 10 courses:

- ACC 401, Essentials of Accounting;
- O&M 401, Managerial Economics;
- APS 401, Probability and Decision Analysis;
- CIS 401, Information Systems for Management;
- APS 402, Data Analysis and Forecasting;
- FIN 402, Capital Budgeting and Corporate Objectives;
- OMG 402, Operations Management;
- MKT 402, Marketing Management;
- MSM 403, Structuring Management Decisions;
- O&M 403, Organization Theory.

A two-course Management-Communication Sequence comprised of GBA 401, Presentation Skills, and GBA 402, Business Writing and Editing, is also required.

**Concentrations and Electives**

Elective courses in each of the 11 areas of concentration are devoted to applying, implementing, and integrating the principles learned in earlier courses. Students must complete at least one concentration in a functional area of business, as follows:

- Accounting and Information Systems
- Corporate Accounting
- Public Accounting
- Computers and Information Systems
- Finance
- Marketing
- Operations Management
- Organizations and Markets
Many students choose to complete concentrations in more than one of the functional areas listed above. In addition, students may choose to complete the Business Environment and Public Policy concentration, which must be taken in conjunction with another functional-area concentration.

Interdisciplinary concentrations in Entrepreneurship and International Management are also offered. These are broad in focus, apply material from the functional areas of study, and must be taken in conjunction with at least one of the functional-area concentrations listed above.

Courses from other schools and colleges of the University may also be taken, with M.B.A. Program Committee approval, when related closely to the student’s area(s) of concentration.

APPLICATION INFORMATION
Priscilla Gumina
Assistant Dean for M.B.A. Programs
William E. Simon Graduate School of Business Administration
Schlegel Hall
Rochester, New York 14627
(716) 275-3533

CONCENTRATIONS

Accounting and Computers and Information Systems
In response to the automation of major accounting functions in organizations, the Simon School has designed an integrated concentration in computers and information systems and accounting which provides thorough training in both areas.

Corporate Accounting
The corporate accounting major is actively recruited by corporations for positions in controller’s, treasurer’s, and internal auditing offices, as well as in accounting departments.

Public Accounting
This concentration meets the educational requirements of the State of New York for admission to the Uniform Certified Public Accounting Examination used by all states and has been registered with and approved by the Division of Professional Education, New York State Education Department.

Business Environment and Public Policy *
This concentration provides students with the skills to understand the economic environment in which a firm operates for business success.

Computers and Information Systems
The computers and information systems concentration prepares graduates for management responsibilities in using computer systems and will enable them to provide organizations with successful management information systems.

The Entrepreneurship Concentration *
The Simon School is committed to the teaching of entrepreneurship. The Entrepreneurship concentration allows the student to draw from a variety of carefully selected courses to become a business generalist who is well versed in organizing and managing resources.

Graduates with this concentration have started their own ventures or have pursued "intrapreneural" careers with major corporations. Students often combine this concentration with Finance or Marketing to further enhance their educational base.

Finance
This concentration provides students with state-of-the-art techniques for financial analysis. Students learn to formulate and solve important corporate finance problems and learn to obtain information from the many data bases on financial markets.

The International Management Concentration *
The International Management concentration gives students opportunities to apply various disciplines to international markets. Differences in legal environments, currencies, and workplace practices among countries provide both challenges and problems for businesses operating in the global marketplace.

There are two options for satisfying the concentration. The first involves one required course and three electives. The second involves one required course, one elective, and one term (minimum of six credits) in an approved international exchange program.

Marketing
The marketing concentration continues to be a strong area of opportunity for graduates with an M.B.A. The concentration gives students excellent preparation for marketing research, marketing consulting, and product management.

Operations Management
Operations management is concerned with the managerial decisions by which a firm allocates and utilizes its physical, financial, and human resources to produce goods or services. The resurgence of interest in operational productivity has reinforced the demand for M.B.A.s with the ability to analyze resource management problems in manufacturing and service firms.

Organizations and Markets
This concentration focuses on the theory of the firm, also popularly referred to as price theory. There is a growing recognition that understanding the economics of corporate behavior is essential to managers for making sound business decisions. This concentration provides students with a solid foundation of this discipline.

RESEARCH ACTIVITY
Research activity at the Simon School includes independent research conducted by faculty and graduate students and other studies carried out at the School’s research centers.

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REGULARLY OPEN TO UNDERGRADUATES

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221. Cost Accounting. Study of the accounting problems involved in determining, analyzing, and controlling production and distribution costs, and income determination for financial statements. Budgetary control, standard costs, and other topics are discussed from the viewpoint of management use in planning and control. Prerequisite: ACC 201.

BEHAVIORAL SCIENCES IN INDUSTRY

241. Fundamentals of Personnel Administration. A survey of all aspects of human resources. Topics include strategic planning, staffing, training and development, compensation, benefits, health and safety, employee and union relations, and laws governing how organizations must treat people. Open to juniors and seniors only.

COMPUTERS AND INFORMATION SYSTEMS

215. Foundations of Management Information Systems. A survey of information system technology and its application to the various functional areas of business. Topics include a complete overview of computer hardware and software, introduction to systems analysis, database management systems, data communications, system development and acquisition, management of computing, and analysis of the strategic considerations of information systems for business. Prerequisite: one of EE 171, OPT 105, CSC 108, CSC 171, CSC 181, or any 200-level CSC course.

225. Data Management. An in-depth study of data management, data processing, and database techniques. Topics include input and output processing, data structures, sequential, direct, and indexed access methods, report generation, and theory and practice of database management systems. A high-level data processing language (COBOL) is used by students for file processing. The design, operation, and management of database systems are practiced using a relational database product (SQL/DS). Prerequisite: CIS 215.

FINANCE

205. Financial Management. This course provides a market-oriented framework for analyzing the major types of financial decisions made by corporations. Discounted cash-flow techniques are introduced and applied to the capital budgeting problem (the choice among alternative investment projects) and financial asset valuation. Security markets are discussed and topics of capital market efficiency and portfolio theory are introduced. The effects of capital structure and dividend policy on the value of the firm are analyzed. Prerequisites: ACC 201; ECO 207 or equivalent.

GENERAL BUSINESS ADMINISTRATION

157. Fundamentals of Business Administration. An introduction to the principal activities, responsibilities, types of policy problems, and interrelationships of the main phases of business, including personnel, production, marketing, and finance. Frequent use is made of business cases for illustrative purposes and to introduce the student to the method of business problem analysis. Not open to freshmen.

291. Reading Course. Independent study in some specific area of business administration, at a level advanced beyond that of regular course offerings. Prerequisite: written approval of the supervising faculty member.
LAW
205. Business Law. A study of basic principles in several fields of law of significance to businesses and other organizations, including constitutional law, contracts, and business torts. This is preceded by a review of certain environmental and historical aspects of the law, including the legal processes by which our laws are created, and the functions of the courts. Throughout, the emphasis is on developing an understanding of the reasoning process used by the courts to resolve disputes and define new law. Open to juniors and seniors only.

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OPERATIONS MANAGEMENT
231. Operations Management. The course discusses problems encountered in managing the production of goods and services, and models and techniques for dealing with these problems. Emphasis is on developing analytic insight into selected models which have proved useful. Topics include strategy and tactics, decision theory, forecasting, production management, material planning, project planning, and quality control. Video presentations and case discussions are also included to gain practical insights into the operations function. Not open to freshmen.
University's degree requirements, students considering a career in teaching should discuss their plans with a College of Arts and Science faculty advisor and a Warner School subject area specialist as soon as possible.

**ADMISSION REQUIREMENTS**

1. Junior standing and evidence, including good academic standing, that certification and bachelor's degree requirements have been completed by the end of the senior year.
2. A grade-point average of 2.5 or higher in the field selected for student teaching and an overall grade-point average of 2.0 or higher.

**APPLICATION PROCEDURE**

The following steps must be taken by students seeking admission:

1. Obtain instruction and application form from the Office of Academic Services, 304 Lattimore Hall, early in the first semester of the junior year.
2. Return completed application to the Office of Academic Services and receive interview assignments.
3. Meet with the assigned faculty advisors for interviews and (following admission) preliminary program planning.
4. Enroll, at the next regular registration, in the courses selected in conference with the assigned faculty advisors.

For applications and further information, contact the Office of Academic Services, 304 Lattimore Hall, (716) 275-3950.

**FIFTH YEAR IN TEACHING PROGRAM**

Recognizing the critical national, state, and local need for minority teachers, the University of Rochester has begun a unique program to encourage its minority undergraduates to enter the field of teaching. This program, Fifth Year in Teaching, provides full tuition to African-American, Native American, and Latino University of Rochester graduates who are U.S. citizens or permanent residents. Students apply during the senior year and are accepted for full-time graduate study in the Warner School's Master of Science or Master of Arts in teaching degree programs leading to certification in teaching. Scholarships covering the cost of on-campus room and board are available for students with financial need; university loans (forgivable after one year of teaching) are available for students who are not eligible for room-and-board scholarships. Graduates of this program are obligated to teach for one year in an urban school in the United States. For applications and further information, contact the Office of Academic Services, 304 Lattimore Hall, (716) 275-3950.

**THE 3-2 PROGRAM IN HUMAN DEVELOPMENT**

The 3-2 program offers an opportunity for qualified students to begin graduate study toward the Master of Science degree during their senior year, and to complete the master's program in one year of postgraduate study. Students may concentrate in research in psychological development or school counseling.

In the first year of the 3-2 program, students finish their undergraduate program and receive the bachelor’s degree in their undergraduate concentration at the end of the senior year; they are simultaneously enrolled in the master's degree program, completing 15 credit hours of graduate coursework that are part of credit-hour requirements for both degrees. In the second year, the final graduate hours are devoted to coursework in the student's area of concentration. A master's thesis is required for research in psychological development and school counseling.

**ADMISSION REQUIREMENTS**

1. Junior standing, with a grade-point average of approximately 2.8 or higher.
2. Evidence that the student's undergraduate concentration will be completed by the end of the junior year, or assurance from the concentration department that requirements for the bachelor's degree will be met by the end of the senior year.
APPLICATION REQUIREMENTS
1. Obtain application form, early in the junior year, from the Office of Academic Services, 304 Lattimore Hall, (716) 275-3950.
2. Schedule an appointment for an interview with an appropriate Warner School faculty member.
3. Return completed application to the Office of Academic Services by February 1 of the junior year.
4. Upon admission, students will be assigned an academic advisor in the Warner School, so that a program of study may be planned.

For applications and further information, contact the Office of Academic Services.

GENERAL COURSES:
PERSPECTIVES ON EDUCATION
The following list gives a general indication of the courses available in the Margaret Warner School of Education and Human Development. (Undergruates receive 4 credit hours for each course.) Complete course listings and descriptions are available at the receptionist's window, third-floor lobby of Lattimore Hall.

EDU 227. Introduction to Children's Literature. This course includes a survey of the major categories of books which make up the field of children's literature. Participants study the criteria used to evaluate the quality and validity of literary selections. Special attention is given to the role of literature in the lives of children.

ED 410. The History of American Education. This course defines education broadly as the formal or conscious transmission of culture, in family life, colleges, peer groups, youth agencies, religious and cultural organizations, and the media. The processes of cultural transmission across four centuries of American history, beginning in the mid-1600s, are investigated, but the major emphasis is on post-1900 themes. Issues of race, class, ethnicity, and gender are a key component of the course. Readings involve mostly primary sources, including novels, autobiography, and newspapers, as well as selected biographies and works of historical interpretation.

ED 415. Adolescent Development. A course designed to provide an understanding of the adolescent student population. The course integrates issues and theories of adolescent development with group dynamics and with information on adolescents in school settings.

ED 416. Biography, Autobiography, and the Creation of Knowledge. This course employs historical and psychological perspectives to examine the constructions of lives, and the interpretation by others of those constructions. Autobiography is defined as the purposeful re-creation of the past in the present, by the self, in terms of what is socially and culturally possible at a given historical moment. This process is viewed in selected autobiographies, exploring their constructions through an examination of psychological studies, oral histories, and literary theories of autobiography and narrative. Also examined are different theories of biography, including (1) biography as a model for cultural reproduction (great man/great woman theory), (2) biography as myth and symbol, (3) educational biography, (4) feminist biography, and (5) psychoanalytic biography.

ED 417. The Education of American Women: A Social and Cultural History. This course examines American women's experiences with education and as educators from the seventeenth century to the present. Topics covered include the following: women's role in family or domestic education; the gradual admission of women to formal schooling between 1800 and 1900; the "feminization" of the teaching profession; social class, racial, and ethnic differences among women as they affect education; women as academics; women in other educating professions, such as social work and journalism; and affirmative action. These themes are discussed within the context of American history, including economic and ideological changes as they relate to the social construction of gender.

ED 418. The Family and Social Dynamics. This course studies the family as a social institution, exploring how the family is related to other institutions and how this relation has changed historically. It considers the reciprocal relations of the family with forces external to it, and how it is constituted by, and articulated with, the lives of its individual members.
ED 420. Legal Issues in Medicine and Education. This course provides an introduction to a set of legal problems common to the human services of medicine and education. Among the topics are abortion, the right of patients to refuse lifesaving care and other forms of medical treatment, informed consent, the rights of the mentally ill, compulsory inoculation and inoculation of the young, regulating access to potentially harmful medical and educational treatments, malpractice suits brought against physicians and teachers, the right to medical care and education, inequalities in the provision of medical and educational services, and the rights of the individual physician and teacher.

ED 422/222. Western Education in Historical and Contemporary Perspective. This course covers the broad area of education and socialization from the European Renaissance to modern America. It considers the development of education in its social and historical contexts. Topics covered include the following: family structures and attitudes toward family life and child-rearing; domestic life and the education of women; social status and educational opportunities; primary schooling and literacy; the curriculum and pedagogy of secondary education; educational change and school reform movements.

ED 425. Urban Education: Problems and Prospects. This course investigates theory, research, and practices influencing the progress and survival of urban schools. Based upon a sociological analysis of events and processes in urban areas, the course examines how complex social forces affect teachers, students, administrators, curricula, and the organization of schools. Issues related to deindustrialization, segregation, family composition, and social inequality are stressed. The effects of political and economic transformations are also covered.

ED 427. Cultural Studies in Education and Society. This course addresses the question of difference and diversity in social and cultural contexts. Cultural studies open up new ways of thinking about the everyday experiences of groups marginalized by race, class, gender, and ethnic difference. Educational studies raise questions about knowledge and cultural representations in educational encounters. A major assumption of this course is that an understanding of the dynamics of teaching and learning requires a strong foundational knowledge of the cultural processes which operate within the context of schools. Through reflection on theoretical writings and fictional works, as well as film and other popular media, students examine how culture is differently lived, represented, and signified, and how the politics of understanding and misunderstanding work through educational practices.

ED 442. Race, Class, and Gender in American Education. Whether and how schools (K-12) reproduce race, class, and gender inequalities is the focus of this course. The course integrates educational theory and teaching practices by analyzing recent changes in sociological and political explanations for social inequality, reviewing research on the reproduction and production of educational inequalities, and evaluating and implementing proposals for school and classroom reform.

ED 443. Cognition and Instruction. This course focuses on cognitive investigations of instruction and learning. The following are discussed: cognitive analyses of tasks and performances that are instructionally relevant, general theories of skill and knowledge acquisition, and cognitive-theoretical analyses of instructional interventions. Readings are research articles drawn from a variety of subject matter areas, at all levels from kindergarten through college.

EDU 444. Motivation in Education. This course covers the issues of motivation in educational settings from multiple theoretical and empirical perspectives. Discussion centers on psychological, interpersonal, and institutional impediments to student and teacher motivation. Research agenda and practical educational strategies are developed as part of the coursework—working groups are formed to analyze and suggest potential strategies for improving understanding of motivational issues in schools and for integrating a motivational perspective into educational reform efforts.

EDU 459. Contemporary Issues in School Counseling. The review and analysis of current issues and considerations in addressing a variety of contemporary problems in educational settings. Emphasis is placed on the role and function of the counselor in programs that deal with teen pregnancy and suicide, drug and alcohol use, child and sexual abuse, school dropouts, homophobia, and counseling in a multicultural setting.

EDU 461. Cognitive Development. An examination of the development of cognitive processes, including thinking, language, and memory. Research in these areas is discussed in relation to theories of development and education.

EDU 462. Introduction to Learning and Learning Disorders. An overview of cognitive processes in learning and learning disorders. Learning disorders are viewed from two related perspectives: theoretically—a way of understanding cognition and cognitive development, and practically—cognitive theory in educational practice. Topics include contemporary cognitive theory and research, intelligence, motivation, and creativity. The emphasis is on an understanding of practical cognitive activity in the context of everyday life.

EDU 467. Language Development. An examination of the processes involved in language development. Developmental changes in syntax, semantics, phonology, and conversation are discussed. Theoretical and empirical research in the area of language acquisition is presented and evaluated.

With the approval of the student's undergraduate academic advisor and the instructor, students are welcome to take additional introductory graduate courses (400 level) in the Warner School.

For additional courses and further information on the Margaret Warner School of Education and Human Development, consult the Official Bulletin: Graduate Studies or contact the Office of Academic Services, 304 Latimore Hall, University of Rochester, Rochester, New York 14627, (716) 271-3950.
ACADEMIC SUPPORT SERVICES

In addition to consulting their faculty advisors, all undergraduate students in the College of Arts and Science are strongly encouraged to use the services of the College Center for Academic Support throughout their college careers. The professional advisors in this office assist students in arranging their programs, suggesting courses, obtaining faculty advisors, and making the unavoidable paperwork as simple as possible. Questions concerning certificate programs, the "Take Five" Program, interdepartmental studies, and many other concentrations will be answered.

The Study Abroad Office, University Tutoring Program Office, and Orientation Program Office are located in the Center in Lattimore Hall. Immediately adjacent to the Center is 312 Lattimore the Academic Information Counter serves as a focal point for satisfying quickly many routine academic inquiries, for making immediate appointments or walk-in arrangements to see an academic advisor or class dean, and for providing fast referrals to other offices. The counter is open on weekdays from 9 a.m. to 5 p.m., including the period from noon to 1 p.m. Most College of Arts and Science forms and general academic materials can be picked up at this counter. Students should feel free to consult members of the staff whenever they have questions about courses, degrees, or any other academic matter.

The College of Engineering and Applied Science offers academic advising through a faculty advising system and the Dean's Office, 401 Dewey Hall.

The Margaret Warner Graduate School of Education and Human Development offers advising and information assistance related to programs in education through its Office of Academic Services, 304 Lattimore Hall, and through faculty of the school.

PROGRAM PLANNING

One of the University's goals is to help undergraduates plan an integrated program of study which will provide intellectual satisfaction and challenge. Program planning with the help of faculty advisors begins during Summer Orientation and continues throughout a student's academic career at Rochester. Discussions with faculty and professional staff advisors are useful in working out a schedule of courses for a particular semester as well as an overall plan for future semesters. Many special services designed to assist undergraduate students are described below.

FACULTY ADVISORS

Freshmen interested in degree programs in the College of Arts and Science continue the advising relationship with their freshman advisor begun during Orientation throughout their first year. After being admitted to an area of concentration at the end of the sophomore year (or after completion of 16 courses in the case of part-time students), students are assigned faculty advisors in their area of concentration.

Students interested in degree programs in the College of Engineering and Applied Science have faculty advisors assigned to them at the beginning of the freshman year and are encouraged to consult with them frequently.

Students entering the University with a declared interest in nursing will be assigned a School of Nursing faculty advisor. Students interested in exploring nursing as a career option should contact the Office of Admissions at the School of Nursing, (716) 275-2375.

PROGRAM PLANNING WORKSHOPS

During Summer Orientation sessions, faculty members representing all River Campus academic areas are on hand to assist new students in choosing and registering for courses. In November and in April, during a period called "early registration," students already enrolled who have financial clearance from the bursar select their courses and submit their class schedules for the following semester to the registrar. Each semester, just prior to early registration, the College Center for Academic Support coordinates advising-related events where students may obtain help in planning programs, concentrations, and sorting out the ways in which academic goals may be fulfilled.

REGISTRATION

Entering students register for their courses during one of the orientation programs scheduled during the summer. Returning students who have received financial clearance from the bursar may register during the early registration periods scheduled in November and April. A person is not considered a student until registered.

Students who have not received financial clearance before the early registration periods will forfeit their priority for course selection and lose the opportunity to participate in the room drawing procedure.

In cases where students settle their accounts after the early registration period, the bursar's office will notify the registrar's office that the student is cleared for registration. Cleared students may then submit their registration and apply for on-campus housing. Should accounts remain unsettled at the end of the term, the bursar's office will refer such cases to the dean of the student's college for withdrawal for financial reasons.

UNIVERSITY TUTORING PROGRAM

The University Tutoring Program is administered through the College Center for Academic Support. This University-wide service
offers, through a carefully selected group of tutors, supplementary tutorial assistance to students based on their individual needs. The tutor's role is to help provide the student with a better understanding of the subject and to help discover and remedy the cause of the difficulty.

Students interested in tutorial assistance should apply at the College Center for Academic Support. Financial help to those students needing it may be arranged upon recommendation of the Financial Aid Office.

Only tutors approved by the University Tutoring Program are paid for their services. Students wanting to become tutors are welcome to apply at that office.

**STUDY SKILLS COUNSELING**

Counselors in Learning Assistance Services, 124 Lattimore Hall, offer help in study skills and math by talking with students individually and helping them to develop strategies for studying more effectively and efficiently. Tutors in the College Writing Center, 100 Morey Hall, help students to examine their written work, correct problems, and make appropriate revisions. (See page 183.)

**COURSE DEFINITION**

The ordinary unit of undergraduate instruction is the course. Most courses numbered between 100 and 399 carry the equivalent of four hours of credit. Some courses carry one, two, or three credit hours. Every four-hour course requires approximately one-quarter of the student's working time for one term. Restrictions concerning prerequisites and approved required are noted in each semester's schedule of courses and must be observed carefully. In some cases, special forms are required and may be obtained in the appropriate advising offices.

**PROGRAM OF COURSES**

A normal schedule for regularly enrolled students is four courses per semester. This permits completion of the 32 courses required for graduation in eight semesters. Full-time students are expected to take four years for the degree. A few accelerate. Others occasionally find it necessary to make up work during the summer. Taking extra credits is not considered a means of speeding up the timetable for attaining a degree, but rather a means for enriching an academic program. Only students with a "B" average or better are permitted to take more than 10 credit hours per semester. This is referred to as an "overload." First-year freshmen are not permitted an overload. For full-time students, fewer than 14 credit hours is termed an "underload." Both overload and underload programs must be approved by the dean of the college in which the student is enrolled. If credits in excess of the standard four-course load are used to accelerate, a retroactive tuition adjustment will be assessed for all credits in excess of the normal 16-hour course load per semester counting towards degree requirements.

**Course Numbering System**

<table>
<thead>
<tr>
<th>Course Numbers</th>
<th>Meanings</th>
</tr>
</thead>
<tbody>
<tr>
<td>001-099</td>
<td>Noncredit courses*</td>
</tr>
<tr>
<td>100-189</td>
<td>Intensive courses—usually at the freshman and sophomore level, no graduate credit</td>
</tr>
<tr>
<td>190-199</td>
<td>Freshman preceptorials</td>
</tr>
<tr>
<td>200-299</td>
<td>Courses at the junior and senior level that may also carry graduate credit</td>
</tr>
<tr>
<td>300</td>
<td>Study abroad</td>
</tr>
<tr>
<td>301-599</td>
<td>Experimental courses, independent courses, courses toward degree with distinction or honors</td>
</tr>
<tr>
<td>400-489</td>
<td>Graduate courses at the master's level or the first year of graduate study; open to undergraduates by special permission</td>
</tr>
<tr>
<td>490-499</td>
<td>Master's-level reading or research courses</td>
</tr>
<tr>
<td>500-589</td>
<td>Advanced or specialized graduate courses—usually at the doctoral level</td>
</tr>
<tr>
<td>590-599</td>
<td>Doctoral-level reading or research courses</td>
</tr>
</tbody>
</table>

**CLASS ATTENDANCE**

Each instructor sets the regulations regarding attendance for each class; many do not make class attendance mandatory. However, consistent absence from class may determine whether or not students pass a course. When it is necessary to be absent because of travel or illness, students are expected to make arrangements with instructors for catching up on class work they miss.

Students may wish to contact University Health Service (UHS) when an illness causes them to be absent from class and they believe medical certification will be required by the course instructor. If a student has been seen by a Health Service provider during the course of an illness, the UHS, upon request of the student, will be able to document the knowledge of the illness or restricted activity. Where services have been obtained from UHS Counseling and Mental Health Services, only the fact of the receipt of services will be documented.

**STUDENT RETENTION**

Of the 1,216 full-time, first-time freshmen who enrolled at the University in the fall of 1991, 93 percent had returned for the fall of 1992.

**SPECIAL ACADEMIC OPPORTUNITIES**

Students are encouraged to take courses offered by any University of Rochester school or college—or study elsewhere if necessary—to fulfill academic goals. Admission to certain courses requires special permission. Usually, this means permission of the instructor, whose signature is then required on the registration form. Special requirements must be met in the following instances:

**Affiliated Area College Courses.** Students who wish to take a course at one of the area colleges in order to complement their programs of study may obtain information and registration forms from their college's advising offices or the Office of the University Registrar. Grades received in approved courses are noted on the transcript, except for freshmen, but are not used in computing the grade-point average.

**Applied Music Courses at the Eastman School of Music.** Students desiring to enroll in one of these courses should consult the Music Advisor on the River Campus. Application forms for applied music courses are available from the Music Office, Todd Union.

**Audited Courses.** If a student plans to participate in class sessions and work without earning a grade for a course, and without earning credit toward a degree, the course may be included in the class schedule at the time of registration. There is no extra cost for matriculated full-time students, but permission of the instructor is necessary. The audited course will not appear on the transcript.

**Freshman Preceptorials.** Announcements of these offerings are advertised prior to each semester. Enrollment is by application; materials are mailed to freshmen in the summer for fall courses and are available in the Center for Academic Support for spring courses. These courses may be used to satisfy foundation requirements.

**Graduate Courses.** Qualified undergraduates may, with the written permission of the instructor and the approval of their dean, register for graduate-level courses.

**Honors Seminars.** Special application is required in some cases. Courses and restrictions are listed in the schedule of courses.

*Noncredit course fees: All persons attending noncredit courses must pay fees as announced for these courses. If they are organized outside the normal academic framework, noncredit courses may not be covered by the usual blanket undergraduate full-time tuition.
Independent Study Courses. Formal arrangements must be made with appropriate faculty members for these special reading or research courses. An Independent Studies Form is submitted to the appropriate college advising office at the beginning of the semester. Students are eligible to apply for a 4-credit-hour independent study course each semester. Independent study courses required specifically for a concentration are listed under departmental offerings. Internships provide another kind of independent study.

Internships. In the College of Arts and Science, these off-campus learning experiences require that arrangements for academic credit be made by the end of the third week of the semester. A maximum of eight hours of credit for Rochester-area internships may count toward the degree. Students who obtain approval from the Internship Committee for work outside the Rochester area may receive as much as a full semester's credit toward their degree. Admission to some programs is highly selective. Questions should be addressed to the College Center for Academic Support in 312 Lattimore Hall.

The College of Engineering and Applied Science cooperates with private industry to provide several internships to selected undergraduates. Interns are paid for their work experience and thus do not receive academic credit. However, written evaluations of the work experience, both by the student and the employer, in some cases, do become part of the intern's academic record. Students will receive information concerning these opportunities as they become available.

Participation Courses. One-credit "participation" courses may be attached to existing courses with the instructor's approval. These courses provide a significant component of out-of-class participation and service that is related to the in-class learning involved in the four-credit courses to which they are attached. Students who satisfactorily complete the one-credit participation course receive the grade of "P".

Study Abroad. Information about the various programs sponsored by the University of Rochester and about other opportunities for study abroad is available in the College Center for Study Abroad and Interdepartmental Programs in Lattimore Hall. (See page 26.)

Summer School Courses. Day and evening courses in a variety of fields are offered in several sessions each summer at the University. Grades earned in these courses are calculated into the cumulative grade-point average, and credit toward the degree is awarded for courses in which passing grades are earned. Students also take advantage of special opportunities to study abroad on one of Rochester's programs. Credit for summer study at other institutions may require approval from the department offering comparable work at the University of Rochester. Approved summer work at other institutions completed with a grade of "C-" or better is recorded in terms of course credit, but the grades are not used in computing the student's cumulative average. Further information and approval forms are available at the colleges' advising offices.

Ventures. These integrated course sequences for freshmen (described on page 34) are open by application. Courses taken as part of a Venture may be used to satisfy foundation requirements. Materials are mailed to freshmen before Summer Orientation.

Double Majors

Students enrolled in the College of Arts and Science or in the College of Engineering and Applied Science may choose to pursue two concentrations, provided that both lead to the same bachelor's degree. In most instances students may do so by fulfilling concurrently the concentration requirements determined by each of the two departments and by receiving written permission (usually on the concentration forms) from the respective concentration advisors.

Double Degrees

Students who plan a program leading to more than one baccalaureate degree, such as the Bachelor of Arts and a Bachelor of Science, are required to meet all requirements for each degree and to augment the minimum number of courses or credits usually required for either degree. The amount of augmentation will be determined individually by faculty members and deans in each area, taking into account the quality of work submitted. The approval forms are available in the deans' offices of the colleges awarding
undergraduate degrees. Students who wish to complete work in two areas of concentration as part of a single degree need only obtain approval for each concentration and for the double major (see Double Majors above). The requirements for double degrees within the College of Engineering and Applied Science are specified on page 136.

Minors

Students may choose to minor in one of the several dozen areas available to them (see list of minors, page 13). For students in the College of Arts and Science, one minor is permitted with a single major concentration; students who complete two concentrations (double major) may not have a minor. Students are eligible to declare a minor after they have been accepted into a concentration and before the end of the first semester of their senior year.

ACADEMIC PROCEDURES

Full-time students are subject to the following regulations. Part-time students should check with their college of enrollment for any variations in regulations.

Course Changes

Students register for their courses during early registration or at Summer Orientation, as described earlier. They may later change their programs and withdraw from a course, add a course, or drop one course and substitute another. These changes are made on a Change Notice (drop-add form) that may be obtained from the appropriate advising office or registrar's office. Change Notices may be filed at the specified time (about three weeks after early registration and again at the beginning of the semester) until the deadline for the particular action, as described below.

Students in either the College of Arts and Science or the College of Engineering and Applied Science may add independent study courses through the third week, and other courses through the fourth week, with the instructor's written approval, and drop them without penalty through the last day of classes, providing the instructor has been informed. Courses from which students have withdrawn will not appear on their transcripts. In the College of Arts and Science, the advising record will show a 'W' and the week of the semester in which the course was dropped for all actions taken after the fourth week.

Students in the College of Engineering and Applied Science may add or drop a course during the first seven weeks. Courses added require the instructor's signature. Courses which are dropped in the first seven weeks will be deleted from a student's record. The signatures of the faculty advisor and the associate dean are required. To drop a course after the seventh week, a student must obtain the signatures of the instructor, his or her advisor, and a dean of the college. The instructor has the option of refusing to sign the change notice; in this case, the instructor will assign the letter grade the student has earned at the end of the semester. No record of withdrawals will show on the official transcript.

Students in the School of Nursing may not add courses after the start of the semester; courses may be dropped until classes end with the permission of the Associate Dean for Academic Affairs and the faculty advisor. In all colleges, course changes can be made only if the college's deadline is met, if the instructor of the affected courses approves, and if the change meets the provisions outlined earlier for overload or underload schedules. Students in the College of Engineering and Applied Science must also obtain the approval of their faculty advisor and the associate dean.

Student Petitions

The faculty of each college establishes degree requirements within that college. The faculty recognizes that there are instances in which interpretations are required and exceptions should be made. The Administrative Committee of each college, comprising both faculty and students, reviews requests for exceptions to faculty regulations.

Students seeking exceptions to regulations submit a written petition to their advising office for review by the appropriate committee. It is an advantage to discuss the content of the petition with a faculty or academic advisor before submitting the petition. Students will be informed in writing of the committee's action.

Satisfactory-Fail Option

Undergraduate students are encouraged to venture outside of their areas of concentration, investigate new disciplines, and discover new, perhaps unsuspected, interests. The satisfactory-fail option may reduce anxiety about electing a course in an area in which the student has had little or no prior experience.

Students enrolled in the College of Arts and Science and the College of Engineering and Applied Science may elect to take one course per semester up to a maximum of eight courses and receive grades of Satisfactory (S) or Fail (F). The grades "S" and "F" do not affect the cumulative grade-point average.

Instructors assign and submit regular letter grades for students choosing this option, as these are not informed which students have elected the option. The registrar records "S" for letter grades "A" through "D-" or "F" for the letter grade "E" on the student's permanent record, retaining the letter grades "A" through "E" on file. Students who are interested in conveying maximum information on the transcript to professional and graduate schools should speak to an advisor prior to electing the option.

Students enrolled in the College of Arts and Science may declare the option in the College Center for Academic Support through the fourth week of classes and, except for transfer students in their first semester who may change or declare the option through the thirteenth week of the semester, the option may not be changed. The option is not available in summer and may not be elected for courses used to fulfill concentration or foundation requirements, including the upper-level writing or foreign language requirement.

Students enrolled in the College of Engineering and Applied Science may declare the option in the Dean's Office, Dewey Hall, through the fourth week of classes. Once declared, the option may not be changed. Students planning degrees from the College of Engineering and Applied Science should note that courses taken with the satisfactory-fail option may be used to satisfy distribution or English requirements (see page 135) or as free electives for an engineering degree. Further, all courses taken beyond those required for a degree may be taken with the option.

Students enrolled in the School of Nursing may exercise the satisfactory-fail option for one elective course per semester (four credits). Students may declare the option through the Associate Dean's Office in Helen Wood Hall through the fourth week of classes; the option may not be changed.

Procedure for "Incomplete"

If a student in the College of Arts and Science or the College of Engineering and Applied Science is unable to complete coursework by the end of the semester, a form requesting a grade of 'Incomplete' should be obtained from the student's college advising office. This form, indicating the work outstanding, the deadline for its completion, and the action to be taken if the work is not completed must be signed by both the student and the instructor and submitted to the appropriate college office. In both colleges, the student's failure to submit the form, or to complete the coursework, may result in the assignment of the grade of "F" for the course. Only after a final grade has been submitted, whether passing or failing, will the course appear on the transcript of students in the College of Arts and Science and the College of Engineering and Applied Science. The grade of "I," however, will appear on the advising record.

In the School of Nursing, a student receiving an "Incomplete" must complete the coursework prior to the beginning of the following
Students interested in attending other colleges as special students or in beginning medical or law school early should consult their faculty advisors.

Withdrawal and Inactive Status
Students who contemplate withdrawal from the University should consult their colleges' advising offices.

Students wishing to spend a semester or more away from the University to work, to travel, or to study at another institution may apply for "in active" status in their advising offices. Those students who are placed on inactive status pay a nominal fee and receive preregistration materials. Housing priority is assigned in accordance with their classification.

Students holding residence halls contracts who withdraw or are withdrawn from the University for any reason should be aware that their residence hall contracts are automatically cancelled upon receipt of a withdrawal notice from the appropriate advising offices. Withdrawn students have no further claim to their assigned space. Students who are reinstated by the University and who wish to live in the residence halls must submit a new contract, and they will be placed on a space-available basis. These conditions also apply to students in absentia, Study Abroad or in internships, and students going on inactive status who change their plans and request reinstatement for the semester in which they originally had intended to be away.

Adjustment of Charges, Withdrawal and Inactive Status
For students in their first semester who withdraw or declare inactive status during the first 60 percent of the semester, tuition will be adjusted on a weekly prorated basis; no reduction of charges occurs for those who leave during the final 40 percent of the semester. For other students who withdraw or declare inactive status during the first four weeks of the semester, or who change from full time to part time, tuition will be adjusted according to the schedule that follows. A class week is defined as seven calendar days dating from and including the first day of classes of a semester. The period for tuition adjustment will be measured from the beginning of classes to the effective date of the change determined by the appropriate academic dean's office.

Withdrawing or declaration of inactive status, or change from full time to part time, during:
- First week: 80% reduction of charges
- Second week: 60% reduction of charges
- Third week: 40% reduction of charges
- Fourth week: 20% reduction of charges
- After fourth week: No reduction of charges

The room and board charges for all students will be adjusted on a daily prorated basis measured from the beginning of the contract period to the date of contract termination.

With students in their first semester of attendance only, are eligible to receive a prorated refund for up to 60 percent of the semester.

For students withdrawing or declaring inactive status or changing to part-time status for medical reasons, tuition refunds will be calculated after consultation with University Health Service and the appropriate academic dean's office.

Repayments to federal aid programs will be made in the following order: Federal Stafford/ SLS/PLUS Loan Programs, Federal Perkins Loan, Federal Pell Grant, and Federal SEOG.

Withdrawal from the University
Students in the College of Arts and Science contemplating withdrawal from the University need to consult with an advisor in the College Center for Academic Support. Majors in the College of Business, Engineering and Applied Science and the School of Nursing need to consult with a representative in their dean's office.

Adjustment of Financial Aid, Withdrawal and Inactive Status
Because financial aid is based upon anticipated costs, adjustments in these costs because of withdrawal ordinarily will result in a reduction of previously committed financial assistance. The calculation of the reduction will be made by the financial aid officer after verification of the date of withdrawal by the dean and the determination of actual costs by the bursar and the directors of University Services and of Residential Life.
Inactive students studying at another institution are not eligible for University-administered financial aid. Completion of a consortium agreement, however, may allow such students to receive their Federal Stafford Loans, Federal Pell Grants, and, if attending another New York school, Tuition Assistance Program grants.

**Determination of Student Status**

The University retains the right to determine the student's status within the University. The University has discretionary powers to maintain a student's enrollment, to grant academic grades, to authorize graduation, or to confer any degrees or grant any certificates. Each student concedes to the University the right to require the student's withdrawal at any time for any valid reason, including failure to pay the term bill.

**THE GRADING SYSTEM, TRANSCRIPTS, AND DEGREES**

**Grades**

The undergraduate grading system for all River Campus colleges is as follows:

<table>
<thead>
<tr>
<th>Letter</th>
<th>Performance</th>
<th>Grade Level</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>A</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td>Above Average</td>
<td>A-</td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>Above Average</td>
<td>B+</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>Above Average</td>
<td>B</td>
<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td>Above Average</td>
<td>B-</td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Minimum Satisfactory</td>
<td>C+</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Minimum Satisfactory</td>
<td>C</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td>Minimum Satisfactory</td>
<td>C-</td>
<td>1.7</td>
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<tr>
<td>D+</td>
<td>Minimum Passing</td>
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<td>1.5</td>
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<td>D</td>
<td>Minimum Passing</td>
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<td>1.0</td>
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<tr>
<td>D-</td>
<td>Minimum Passing</td>
<td>D-</td>
<td>0.7</td>
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<tr>
<td>E</td>
<td>Failure</td>
<td>E</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Grades which carry no grade points:

- I: Incomplete
- W: Withdraw without effect on the grade-point average
- P: Pass (mandatory grading system in certain courses)
- S: Satisfactory (Satisfactory-Fail option)
- F: Failure (Satisfactory-Fail option)
- CR: Credit (for certain music ensembles)
- NC: No credit (for certain music ensembles)

Additionally, in the College of Arts and Science, if the instructor in any course regards the written work of the student as deficient by reason of exposition style, the grade will be so flagged on the final grade roster. This flag will not become part of the student's permanent record.

**Freshman Transcript Policy**

Because grades are the most common medium of communication between faculty and students about academic progress, faculty members grade freshmen as they do upperclassmen. Within the University, all advice and decisions (such as the Dean's List and academic probation) are based upon the grades that freshmen earn. The official University transcript for the freshman year, however, reports only the courses that were successfully completed and the corresponding credits earned. The cumulative grade point average is based only on grades earned in the sophomore, junior, and senior years. (This policy is under review by the state education department.)

**Dean's List**

An overall semester grade-point average of 3.0 and completion of four full courses, at least three of which have normal letter grades, are required for a student to be named to the Dean's List. For example, a student who receives grades of "A," "B," "B," and "C" would have a 3.0 grade-point average and would qualify for placement on the Dean's List.

For the College of Engineering and Applied Science, Dean's List appointment requires a 3.0 grade-point average or better and the completion of 15 semester hours. Graduating seniors who underload are exempt from the semester credit-hour requirement.

For the School of Nursing, Dean's List appointment requires 3.0 grade-point average or better and the completion of at least 12 semester hours taken for letter grades.

**Probation and Separation**

The colleges regularly review the academic progress of registered students and act to place on probation or separate those not meeting these standards:

- An overall (or cumulative) grade-point standing for all semesters completed of at least 2.0
- A grade-point average for the latest semester of at least 2.0
- Acceptance into an area of concentration before achieving junior standing and, once accepted, a grade-point average of at least 2.0 in the courses submitted for the concentration.

Usually, a college warns a student of impending difficulty by placing him or her on
probation for a semester before considering separation. Students on probation are encouraged to seek advising, tutoring, and counseling assistance. Their advisors are notified of students' academic difficulties, as are the Department of Sports and Recreation (for students on intercollegiate teams), the Director of Minority Affairs (for minority students), and the Department of Naval Science (for students affiliated with the NROTC Program). Any student whose enrollment is continued will be considered in good academic standing.

The dean of the college can be asked to review actions on separation. Any request must be made in writing. Reviews are granted only when pertinent new evidence is presented.

Financial aid for students on probationary status is subject to adjustment. Federal and New York State aid recipients must meet standards of satisfactory academic progress in order to remain eligible for these awards. Additional information about these standards is available from the Financial Aid Office or the University registrar.

**Academic Honesty**
Cheating or plagiarism is a concern not only of the student and the professor involved, but of the entire University. Each student is expected to perform all required work without improper or unauthorized help.

Findings of guilt or innocence in cases of suspected academic dishonesty are decided by the Board on Academic Honesty, not by individual faculty members or proctors. When a complaint is received by the chair of the board, the student's entire file is reviewed and a decision is made whether or not to bring a charge of academic dishonesty. After due notice to the student, the board hears and decides the case, giving the student a fair opportunity for defense against the charge.

The board forwards its findings, the complete file on the student, and its recommendation for action to the dean of the student's college. Appeals from penalties imposed by the dean may be made to the Office of the Provost.

**Grade Reports**
Students receive grade reports from the registrar's office at the conclusion of each semester. The report includes: courses taken, grades received, credit hours earned, and semester and cumulative grade-point averages. Freshman grade reports will include only the semester grade-point average. The University reserves the right to withhold grade reports in the event of an outstanding balance owed the University.

For University policy regarding reports to parents, see University Records, page 208.

**Bachelor’s Degree with Honors**
Certain departments in the College of Arts and Science offer programs of study leading to the degree “with honors.” An honors program requires students to complete a minimum of 12 credit hours in courses designated by the department as "honors courses." These courses must include at least one advanced course or seminar and the course or courses in which the senior thesis or research project is completed. Specific course requirements for each concentration may be found in the appropriate departmental section in this Bulletin.

**Transferring Within the University**

**College of Engineering and Applied Science**
Although freshmen are admitted directly into either the College of Arts and Science or the College of Engineering and Applied Science, they may transfer freely between the two colleges, provided they have completed, or can schedule, the appropriate prerequisites.

Students considering transferring to either college should seek assistance from faculty members and dean's office personnel to help ensure that their first-year courses both explore potential areas of concentration and prepare the student for each one which might be chosen.

Students who satisfactorily complete the four-year sequence receive a B.S. degree in chemical engineering, electrical engineering, engineering and applied science, geomechanics, mechanical engineering, or optics.

Another, less specialized degree program is also available in the College of Engineering and Applied Science. This program leads to a B.A. in engineering science and has the same distribution requirements as other B.A. degrees, including the foreign language requirement. As a result, transfers to and from programs in the College of Arts and Science are easier.

**School of Nursing**

Students intending to complete work for a degree in the School of Nursing are directed to the requirements on page 165 of this bulletin.

Members of the School of Nursing faculty are appointed as advisors to students majoring in nursing.

Students interested in transferring into the School of Nursing at the junior level from any other college in the University or from any other college or university are encouraged to contact the School of Nursing Student Affairs Office, (716) 275-2375, as soon as possible to ensure completion of specific required courses that are transferable to the University of Rochester School of Nursing.
THANKS
MOM
DAD
Students considering graduate studies or employment obtain help from faculty and staff members, college and departmental offices, and the centers described below. Students seek advice and assistance from appropriate departmental offices in conjunction with using the following resources and services.

THE CENTER FOR WORK AND CAREER DEVELOPMENT
The Center for Work and Career Development—formed in the summer of 1991 from a merger of the Student Employment and the Career Services and Placement divisions—assists students in taking the positive steps that will lead them successfully beyond the undergraduate years. The Center, with main offices in 224 Lattimore Hall, is open from 9 a.m. to 5 p.m. Monday through Friday. Among its major activities are these:

Reach for Rochester—an unusual pre-professional employment program offering part-time and summer jobs both locally and nationally that can contribute substantially to funding the student’s education. Supplementary scholarship aid is available to those who work in Reach assignments related to community service.

The Hyman J. V. Goldberg Career Library—a resource center for general career planning and for researching specific job possibilities. Library holdings include a comprehensive collection of print and electronic material helpful in choosing career fields, job-search strategies, specific job openings, graduate-school programs, and employer information.

The Career Cooperative—a nationwide alliance of more than 1,200 alumni volunteers, who, successful in their own professional lives, make themselves available to current students to advise and assist them in the career-planning and search process. In addition to personal assistance, these volunteers participate in a variety of career programs throughout the year.

Pre-Graduation Employment Program—offering opportunities for students, regardless of demonstrated financial need, to work during their college years either in on-campus positions or with Rochester-area employers off campus. From traditional “pocket-money” jobs to truly pre-professional employment, this program emphasizes the financial and experiential benefits of getting a head start in the work world prior to graduation.

Post-Graduation Employment Services—for students making plans to enter the full-time job market. The Center annually schedules on-campus recruiting visits by more than 100 employers, offers a resume referral service; and facilitates contact with a wide variety of employers both for career exploration and for specific job openings.

Career Planning and Job-Search Strategy Services—offering advice to both directed and undirected undergraduates on all of their career-related concerns. The Center staff is ready to help students with articulating their interests, learning how to write resumes and to interview for jobs, developing recommendations files, and exploring graduate schools.

The emphasis in all the programs of the Center for Work and Career Development is on helping students articulate their abilities in the language of a prospective employer or graduate school. Rather than assuming that all English majors intend a career in publishing, or that all political science majors are on their way to law school, the Center recognizes that many people end up in a job not directly related to their major. Instead of viewing such “unrelated” placements as a failure of the system, the Center believes that the ability to succeed in a variety of pursuits is a positive outcome of a Rochester education.
Employers have indicated that the most important skill a job candidate may possess, especially among liberal-arts graduates, may be the ability to work in an environment where no one tells you what to do. Employers tell us they look for candidates with transferable skills—and the softer the skills, the better one needs to be at analyzing achievements and creating bridges from what one has done to what one can do. Luckily, creativity, analytical skills, and the ability to articulate are exactly the skills in which liberal-arts students excel.

While the majority of Rochester alumni enter the employment market immediately upon graduation, almost three-quarters of recent graduates report that they have enrolled in a graduate program within five years of completing their bachelor’s degree. Assistance in this process is generally available through the Center and is complemented by specific preprofessional advising services described below.

MINORITY STUDENT AFFAIRS

The Office of Minority Student Affairs focuses on enhancing the academic life of minority students. The office is committed to encouraging the retention and support of students and their successful negotiation of university life.

Our emphasis on academic success is facilitated by providing such services as student counseling and referrals, promoting educational opportunities, offering workshops and symposia, and broadening the awareness of issues of relevance to minority students in the University community.

Under the umbrella of the Office of Minority Student Affairs are two programs, the Early Connection Orientation (ECO) Program and the Higher Education Opportunity Program (HEOP). ECO is a prefreshman summer orientation program designed to offer supplemental academic support. HEOP serves students of diverse racial, ethnic, and cultural backgrounds. It is a program that provides an opportunity for eligible applicants to attend a private four-year institution of high academic standing. The program is designed to assist those students who, because of their economic or educational background, might not consider attending our University. HEOP staff coordinate a variety of academic support, counseling, and financial aid services to enable a participating student to successfully complete a degree in eight or 10 semesters. To be eligible for HEOP, students must be residents of New York State and meet specific academic and economic criteria.

HEALTH PROFESSIONS

Admission to graduate degree programs in the health professions and health sciences is highly selective. Applicants must have excellent academic credentials as well as personal commitment, knowledge of the profession, and maturity. The University of Rochester has a fine record of acceptance: over 80 percent of those seniors who applied over the last five years are now in medical school and all applicants to dental school were accepted.

Graduate and professional schools encourage prospective students to pursue a baccalaureate degree program in the liberal arts. Professional schools usually have core course admission requirements, including an academic year of general chemistry, organic chemistry, general physics, college mathematics, biology beyond the introductory level, and English. It is not necessary to complete a concentration in the natural sciences, and the University of Rochester does not offer a concentration in "premed," "predent," or any other preprofessional area. With the assistance of counselors in the College Center for Academic Support and faculty advisors from both the River Campus and the Medical Center, students develop an integrated program.

Health professions counseling begins during the Freshman Orientation Programs and continues throughout and sometimes beyond four years. Students are urged to see a health professions counselor in the College Center for Academic Support and establish a credentials file during the first years of college. It is advisable to begin collecting letters of recommendation even that early, and these letters will form a vital part of the faculty advisory committee letter which will be prepared for the student at the time of application to a graduate or professional program.

Each year the Center publishes the guidebook Preparing for a Career in the Health Professions. The Hyman J. V. Goldberg Career Library in the Center for Work and Career Development also contains numerous publications describing individual health professions, helpful information and comments from recent alumni, catalogs for graduate and professional programs, and lists of opportunities for volunteer service.

With the University of Rochester School of Medicine and Dentistry next door and numerous hospitals and clinics in the Rochester area, students have many opportunities both to observe health professionals at work and to participate in research and clinical activities. Some students find paid positions, while a variety of volunteer opportunities is also available. The Campus Y, for those considering medical school, provides a chance for students to volunteer and observe in a hospital setting. The Dental Chaiside Program includes practical experience in assisting a dentist. The Young Adult Volunteer Program provides another opportunity for students to explore career options in the health professions, especially nursing. Many students volunteer in area hospitals and clinics, either in clinical or research capacities. Lists of volunteer possibilities both at the University of Rochester and in the larger community are available in the Hyman J. V. Goldberg Career Library.

The Center sponsors several meetings and workshops of interest to students considering a career in the health professions. The Junior Applicant Meeting takes place each February and helps students begin the application process for programs in medicine, dentistry, osteopathy, optometry, podiatry, and veterinary medicine. At the Interview Skills Workshops students view and discuss videotapes.
of simulated interviews and participate in practice interviews. A Workshop on the Writing of Application Essays is held one evening each spring.

For more information about health professions at the University of Rochester, please write to Health Professions Advising, College Center for Academic Support, 312 Lattimore Hall, University of Rochester, Rochester, New York 14627-0397.

**LAW**

With the assistance of faculty members and deans, prelaw advisors offer students detailed academic information and advice about undergraduate preparation at Rochester, law school admission criteria, the procedure for applying, and careers in the legal profession. Counselors are in regular contact with law school deans and staff, and with Rochester graduates now enrolled in law schools, in order to provide current undergraduates with up-to-date, practical, and factual information. In addition, counselors provide opportunities for students to obtain direct advice from visiting law school representatives and from practicing lawyers. The following are among the special services provided by the Center for Work and Career Development.

Information meetings acquaint prospective law school applicants with the ABCs of the application process and ways to enhance the applicant's chances of acceptance.

Annually revised University publications include *Getting into Law Schools and Applicant Results*, a printout providing information about where the most recent Rochester applicants were accepted, rejected, and/or wait-listed.

On-campus visits by law school representatives each fall semester include deans or other admission officers from about 30 law schools who meet informally with prospective and current applicants individually or in small groups.

Recent law school graduates and successful attorneys are invited to speak about their experiences in law school to all students interested in careers in law.

Comments from recent Rochester graduates now enrolled in law school are available in a notebook in the Hyman J. V. Goldberg Career Library.

We are concerned that our students make the best use of the University's offerings for their personal intellectual growth as well as in preparation for the study of law. For the last 10 years, between 88 and 100 percent of University of Rochester students seeking admission to law school have been accepted at one or more schools. This is well above the national average.

**EDUCATION**

Students interested in careers in education should contact the Office of Academic Services in the Margaret Warner Graduate School of Education and Human Development, 304 Lattimore Hall, (716) 275-3950. Students wishing to apply for teacher certification should consult with the Office of Academic Services by the end of the sophomore year. Placement services and updated job listings for teaching, school counseling, administration, higher education (administration or counseling), and other education careers are available in the Center for Work and Career Development, 224 Lattimore Hall, (716) 275-2366.

**COUNSELING AND MENTAL HEALTH SERVICES (CMHS)**

Counseling and Mental Health Services offers short-term psychotherapy to full-time undergraduate and graduate students at two locations: Towne House, Suite 161–12 (275-3113), and 107 Lattimore Hall (275-2361). Appointments can be made by telephone or in person, Monday–Friday, 9 a.m. to 5 p.m.

Students are seen for a variety of problems such as anxiety, depression, relationship difficulties, family issues, grief, school hassles, and general discomfort about what's happening in one's life. Treatment is available on an individual, couple, or group basis. Therapy groups for students with specific concerns about women's or men's issues, adult children of alcoholics, eating disorders, or sexual abuse are often available.

Contacts with Counseling and Mental Health Services are confidential. The fact that a student is using our service will not be disclosed to any University official or faculty member, or to family, friends, or roommates without permission of the student. CMHS will not release any information about the content of contacts with us even if requested by the student.

**LEARNING ASSISTANCE SERVICES (LAS)**

Academic effectiveness is a major concern of many students. The following services are offered by LAS to help students improve academic performance.

*Study Skills.* Individual counseling and group workshops address concerns about preparing for exams, reading effectively, taking notes, managing time, enhancing concentration, and developing academic motivation.

*Math Skills.* Students can participate in weekly math study groups or work with a math counselor individually to improve problem-solving skills and become more confident when taking math exams.

**Disabilities.** Students with special needs can receive help in planning academic modifications and developing strategies for meeting the demands of coursework.

**Tutoring in Writing.** With the help of College Writing Center tutors, students can refine their skills in prewriting, drafting, and revising in order to fulfill the demands of college-level writing assignments. The College Writing Center also provides Macintosh and IBM word-processing facilities.

**Test Bank.** Learning Assistance Services maintains a test bank of previously administered exams from a range of courses. Students may use these exams to practice for current tests.

**Workshops.** Each semester, a series of workshops is offered on topics such as preparing for exams, taking lecture notes, managing time, writing papers, and practicing for math exams.

Students seeking more information or wishing to make appointments may do so in person or by phone. The main office of Learning Assistance Services is located in 124 Lattimore Hall, (716) 275-9049. Writing tutorials and word-processing facilities are located in the College Writing Center, 100 Morey Hall, (716) 275-3873.

**TESTING**

The Testing Office administers testing programs and services in conjunction with counseling and, in addition, administers those tests that are required for advanced work or special programs.

Additional information about testing programs can be obtained in the Testing Office in 312 Lattimore Hall. The major testing programs administered by this office in recent years include:

- Foreign Language Proficiency Examinations
- Graduate Record Examination (GRE)
- Law School Admission Test (LSAT)
- Medical College Admission Test (MCAT)
- Graduate Management Admission Test (GMAT)
- Test of English as a Foreign Language (TOEFL)
- National Teacher Examinations (NTE)

Questions about other national testing programs should be directed to the Testing Office. If the tests in question are not given there, students will be referred to the proper locations.
The University of Rochester recognizes that its students develop socially, spiritually, emotionally, physically, and culturally, as well as intellectually. The Student Affairs offices and all the student support services are intended to assist this comprehensive development and to help students integrate their lives at the University.

Many students consider their lives outside the classroom as a source of significant and enduring learning experiences, which complement their formal academic pursuits and enrich their personal lives. Informal learning at the University includes broadly diversified opportunities in sports and recreation, sororities and fraternities, student government, a student judicial board, clubs and activities, religious and intercultural programs, off-campus experiences, volunteer work, the performing arts, and residence halls programs. Staff in Student Affairs and other service offices are available to help students make satisfying use of these opportunities.

OFFICE OF THE DEAN OF STUDENTS

Paul J. Burgett, Ph.D. (Rochester) Vice President and University Dean of Students
Jody Asbury, M.A. (Simmons College) Associate Dean of Students
Brooke Gordon-Hare, M.S.W. (University of North Carolina, Chapel Hill) Assistant Dean of Students and University Intercessor
Douglas W. Zipp, M.S. (Rochester) Assistant Dean of Students for Judicial Affairs

Two of the major functions of the Office of the Dean of Students are to:
1. Help students to integrate their in-class and out-of-class experiences at the University
2. Attend to the general quality of student life at the University.

Administratively, Student Activities and Wilson Commons, the Chaplains’ Office, the International Student Office, and services for students with disabilities are part of the Office of the Dean of Students.

In addition, Sports and Recreation, Residential Life, and University Health Service have reporting relationships to the Vice President and University Dean of Students.

The staff in the Office of the Dean of Students works directly with other student service and support offices to enhance the development of undergraduate and graduate students. The staff acts as the principal student advocate in the University, and is available to all students, individually and collectively, for counseling, guidance, and assistance.

Some of the services provided through the Office of the Dean of Students include:

- **Problem Solving.** The staff and students work together to identify and solve problems that affect many members of the University community. Currently, the dean and others are working on projects related to personal safety, concerns of students with disabilities, judicial affairs, retention, women’s concerns, and the special needs of graduate students.
- **Discipline.** The office administers nonacademic discipline. The judicial officer works with the All-Campus Judicial Council to maintain a living and learning environment which is safe and orderly.
- **Dean’s Loan Program.** Short-term, no-interest loans are available to all full-time River Campus students through the Office of the Dean of Students. Funds for the Dean’s Loan Program have come from a number of gifts, including gifts from the University of Rochester classes of 1933 and 1958, as well as a gift from the United States Steel Foundation.

STUDENT ACTIVITIES/WILSON COMMONS

The Wilson Commons Student Activities staff provides professional advice and planning for the active participation of students in a diversified program of social, cultural, and recreational activities. The student activities program is varied and broad. Throughout the academic year students, campus organizations, and academic departments schedule a variety of events during the daytime, evening, and weekend hours.

Wilson Commons is the focal point for out-of-class life on the River Campus. The Commons is the place to meet friends, schedule meetings, plan programs and events, make informal contacts with faculty and staff, or just relax. Located in the Commons are offices for student organizations, dining services, a recreation center, meeting and rehearsal rooms, a hair salon, the Hartnett Art Gallery, the Student Activities Office, and the Office of the Vice President and University Dean of Students.

Participation in the student activities program at the University can help students develop skills, explore new ideas, develop leadership potential, and learn more about themselves.

- **Student Government.** The Students’ Association includes all undergraduates and is governed by a student-elected senate and president. The Student Senate and its over 50 funded organizations are supported by the student activities fee, which is assessed to all undergraduate students. The Senate has five standing committees: the Student Life Committee, the University Relations Committee, the Appropriations Committee, the Club Sports Council, and the Academic Affairs Committee.
- **Journalism.** Students may obtain editorial, business, and writing experience working on publications, including the Campus Times.
COUNSELING AND SPECIAL SERVICES

Counseling and Mental Health Services, University Health Service

Counseling and Mental Health Services (CMHS) of the University Health Service offers evaluation and treatment for a wide variety of problems such as anxiety, depression, difficulties in personal relationships or sexual functioning, coping with academic pressures, etc. CMHS has two offices, one located in 107 Lattimore Hall, and another in the University Towne House. Both offices are open weekdays from 8:30 a.m. to 5 p.m. all year. A mental health professional is on call 24 hours a day throughout the year. See page 183 for a more detailed description of the services offered.

Center for Work and Career Development

Located in 224 Lattimore Hall, the Center for Work and Career Development serves as the focal point in a student’s search for vocational information and advice covering both pre- and post-graduation concerns. Offices are open from 9 a.m. to 5 p.m., Monday through Friday. See the section on Career and Counseling Services for more information on these programs.

Counseling and Mental Health Services, University Health Service

See University Health Service description for services available (page 188).

Services for Students with Disabilities

The University of Rochester provides equal opportunity in admissions and student aid regardless of sex, age, race, color, creed, handicap, sexual orientation, and national or ethnic origin. Further, the University complies with all applicable nondiscrimination laws. Staff in the Office of the Dean of Students work closely with disabled students coordinating support services, resources, and counseling.

International Student Affairs

The International Student Office (ISO) provides a full range of programs and services for approximately 1,000 international students and 200 spouses from 80 countries. This office administers, under specific government regulations, the F-1 Student and J-1 Exchange Visitor Programs. The ISO also interacts with units within the University community to advocate for and address various international students needs.

The ISO is responsible for issuing visa documents and assisting students on all immigration matters. The office is also an information resource which assists internationals in adjusting to life in the United States, the University, and the Rochester community. Other services include the publication of a bi-monthly newsletter, an international support group, and individual counseling to assist students in effectively coping with personal and cultural adjustment. In order to promote intercultural understanding many educational, cultural, and social programs are planned each year: an Orientation Program, International Coffee Hours, Cultural Round Tables, and an annual International Women’s Conference.

The ISO is a member of the National Association for Foreign Student Affairs and works closely with several community organizations such as the Rochester International Friendship Council and Literacy Volunteers who provide hosting and offer a variety of cultural, social, and English-language programs.

THE INTERFAITH CHAPEL

The Chaplains' Office, located in the University's Interfaith Chapel, offers students a variety of opportunities for religious worship and meditation, social service and personal counseling, and cultural and social events. Roman Catholic, Protestant, and Jewish chaplains are available to work with all members of the University community. The Director of University Religious Affairs works with students, chaplains, and University departments to facilitate and coordinate the many programs carried on within the chapel. Chapel rooms may be reserved for lectures, discussions, or social events.

The Protestant Chapel Community focuses on the weekly Sunday service. Attempts are made, both formally and informally, to raise and deal with important issues within the University, church, and society and to involve community and church in University life.

The Interdenominational Worship Community provides the opportunity of worshipping in the African-American tradition.

As the Catholic campus parish, the Newman Community welcomes undergraduate students as well as other members of the University. The Newman Community provides a regular schedule of Sunday and daily Masses and other sacramental celebrations and offers a wide range of opportunities for personal enrichment, education, service, and social events.

The Hillel Foundation serves to transmit the Jewish heritage through educational, religious, cultural, social, and counseling services. The Hillel student leadership is committed to projects on widely divergent aspects of Judaism.

The Chaplains’ Office maintains close contact with representatives of other religious communities which are organized on campus, or are found in the Rochester area. Students belonging to one of these traditions will be put in contact with appropriate representatives either by stopping in at the Director’s Office, or calling 275-4321.

UNIVERSITY HEALTH SERVICE

The University Health Service (UHS) provides a comprehensive, prepaid health care program for all full-time students.

Health Plan. All full-time students pay a mandatory health fee that entitles them to use the Health Service throughout the academic year and the following summer (September to September), as long as they are enrolled on a full-time basis. The health fee has two parts: (1) the mandatory portion which covers medical visits to UHS primary care providers, visits to UHS mental health professionals, and health education; and (2) the waivable insurance (Blue Cross and Blue Shield) portion of the plan which covers diagnostic laboratory tests, x-rays, surgical procedures, infirmary care, hospitalization, and other specific services not covered by the mandatory portion of the plan. A Blue Cross and Blue Shield family insurance plan is available for students who wish to have coverage for themselves and their dependents.

Students already covered by health insurance policies comparable to the University Blue Cross and Blue Shield plan may waive the insurance portion of the plan by submitting the Health Plan Options Form. This form is
included with the registration materials students receive prior to each fall semester and must be submitted each year. Students who waive the insurance portion of the health fee are responsible for paying any charges which the University Blue Cross and Blue Shield plan would have paid.

Should a student choose to see a private physician or seek care outside UHS without the appropriate referrals, the student assumes all responsibility (including financial responsibility) for the health care received.

Confidentiality. The relationship between UHS health care providers and their patients is strictly confidential. The staff of UHS assumes that students and their parents agree that the student is able to give consent for most medical treatment, including minor surgical procedures. Notification of others, including parents, is generally considered the student's responsibility unless the condition is serious or the student is unable to assume responsibility for informing others.

Information about the health plan is sent to students in the fall semester. Pamphlets are also available at all UHS locations, in UHS brochure racks in Wilson Commons and the Administration Building, and by writing the UHS Health Education and Communications Unit, Box 617, 250 Crittenden Blvd., Rochester, NY 14642-8617.

LOCATIONS

Medical Care Section. The Medical Care Section has three locations. The main office is located on the ground floor of the Medical Center at 250 Crittenden Blvd. At this office, comprehensive medical care is provided by faculty physicians (specialists in internal medicine), nurse practitioners, and registered nurses. The office is open Monday–Friday, 8 a.m. to 5 p.m., except Tuesdays, when the office opens at 9 a.m. During the summer, this office closes at 4:30 p.m. Students are encouraged to schedule appointments to be seen in this office. The number to call is 275-2662. Walk-in care is available on a limited basis.

UHS provides access to medical care 24 hours a day throughout the year. During the school year, students needing medical care when the main office and the Eastman School Office are closed should call or go to the UHS River Campus Unit. If the River Campus Unit is closed (summers and vacations), students should call UHS (275-2662 or 275-2161) for instructions on reaching the UHS physician on call. A physician is on call 24 hours a day throughout the year. Unless it is a life-threatening emergency or a serious accident, students should call UHS before going elsewhere (i.e., the emergency department of a local hospital) for care.

Counseling and Mental Health Services. Counseling and Mental Health Services offers short-term psychotherapy to full-time undergraduate and graduate students at two locations: Towne House, Suite 161-12 (275-3113) and Lattimore Hall, Room 107 (275-2361). Appointments can be made by telephone or in person, Monday–Friday, between 9 a.m. and 5 p.m. A mental health professional is available 24 hours a day throughout the year to deal with urgent situations and can be reached at 275-3113 or 275-2361 any time of the day or night.

Students are seen for a variety of problems such as anxiety, depression, relationship difficulties, family issues, grief, school hassles, and general discomfort about what's happening in one's life. Treatment is available on an individual, couple, or group basis. Therapy groups for students with specific concerns around women's or men's issues, adult children of alcoholics, eating disorders, or sexual abuse are often available.

Contacts with Counseling and Mental Health Services are confidential. We will not disclose even the fact of your using our service to any university official or faculty member, or to your family, friends, or roommates, without your permission. We will not disclose any other information about the content of your contacts with us even if you request that.

In addition, we welcome and encourage students to provide proof of immunity to measles, mumps, and rubella. These requirements should be completed before arriving on campus. Students who fail to comply with the requirements will be withdrawn from the University.

RESIDENTIAL LIFE

The Residential Life Program is designed to enhance students' academic progress and opportunities for personal growth. Each area is supervised by professional staff comprised of an Assistant Director for Residential Life and a Resident Director. The Residential Life staff supports student needs and interests with a variety of social and cultural activities developed in the residential setting, through leadership programs, and through programs like special-interest housing corridors, where students with similar academic or extracurricular program interests may live together.

Residents are encouraged to share interests with their roommates and neighbors. Many participate actively in the functioning of their residence hall, for example, by participating in a hall's student government or serving on one of its committees for social, cultural, and educational programming. Students' academic growth may be aided also by the faculty-in-residence program, which fosters informal student-faculty-staff interaction within the halls.

One of the students' earliest contacts with residential living is with the Resident Advisor. RAs are carefully selected and trained upperclassmen who are assigned to floors or corridors in University housing. They provide residents with counseling on making adjustments to academic and campus living, and on developing friendly relationships with roommates and student neighbors. They also provide information on campus resources, basic academic advice; programming and leadership development support; and services in an emergency until other personnel arrive.
Freshmen whose applications for residence space are received on time are guaranteed housing and are generally placed in double rooms in one of the Quad or Towers halls, or in Susan B. Anthony Halls. Opportunities for other living arrangements expand gradually after the freshman year. Although most freshmen and sophomores live in double rooms, six-person suites and single rooms become increasingly available to upperclassmen. These spaces are allocated by a lottery system, with seniors drawing first, juniors next, then sophomores. Rooms are selected by students in the spring for occupancy during the following academic year. In certain buildings, sophomores, juniors, and seniors may elect not to participate in the University’s board plan.

The Residential Living Center
The Residential Living Center (RLC) is the central point for student living needs on and off campus. The RLC is located in the basement of the Gates wing of Susan B. Anthony Halls, with entry via the southwest door of the hall (nearest Fauver Stadium). The Undergraduate Housing area supports all applications, assignment, room change, billing, and administrative and operational functions for the housing system. The Office of Greek Affairs is also located in the Residential Living Center. The director of Greek affairs and staff support the undergraduate, alumni, and national organizations in all areas of Greek and University life. The University’s housing system is coeducational and have a residential life staff, or faculty- or staff-in-residence.

The Towers (Anderson and Wilder) include both suites and double rooms. Suites include four single rooms and one double room, a bath, and common living room. Some nonsuite double rooms have adjoining bathrooms. Twelve RAs and faculty-in-residence staff the Towers, which are coeducational. Freshmen live in Towers double rooms and some suites; other residents of the Towers are upperclassmen.

Southside Residences
De Kiewiet and Valentine Towers house sophomores, juniors, and seniors in two- and three-room apartments with kitchenettes. Two Graduate Head Residents and 12 Resident Advisors staff these buildings.

Towne House, adjacent to the University Medical Center, houses male and female upperclass students in double rooms, each with a private bath. Resident Advisors staff this unit. Male and female rooms are distributed in a random arrangement throughout the building.

Goler House is a large apartment building near the Medical Center and Towne House. Many apartments have been allocated for use by upperclass undergraduates; medical and graduate students, and some faculty and staff, also live in this building. Program support for the undergraduate residents is provided by Resident Advisors.

Community Living in Rochester
Although the majority of undergraduates choose to remain in the residence hall system in their sophomore and upperclass years, the University supports and encourages students who are so inclined to spend a year or so in non-University housing. Sharing an apartment or taking a room in a private home and dealing with one’s own shopping, cooking, transportation, and other daily concerns can be an exciting, maturing, and altogether delightful experience for college-age people. There are several attractive Rochester neighborhoods within a reasonable distance where University students have found pleasant accommodations among other young adults. Community Living students can continue, of course, to take advantage of the wide range of on-campus recreational and extracurricular programs and participate in student government, athletic, religious, and music programs, and to dine when they wish in University dining centers.

Community Living Program
A comfortable place to live is an important aspect to university life. Unfortunately, “house hunting” can be a frustrating endeavor. The University is concerned about the quality of life of its off-campus students. As a result, the Community Living Program has been developed to support students, faculty, and staff when they decide to seek housing in the Rochester community. The program highlights the Community Living Information Center (CLIC), formerly the Off-Campus Living Information Center. The Center provides an array of referral and apartment hunting services. If you decide to move off campus, CLIC can help you in your search for an apartment.

We maintain:

• A comprehensive, up-to-date, computerized directory of available off-campus housing in the Rochester community

• Listings of available apartments, houses, and rooms, as well as a number of roommate wanted ads

• Information concerning subletting, especially for the summer months

• Brochures and handouts related to the apartment hunting process

• Racks of free literature that contain community profiles, area maps, community cultural and recreational events, bus schedules, area classified sections, as well as various campus information

• Sample forms and tips on apartment/inventory check lists, roommate selection, leases, subleasing contracts, roommate contracts

CLIC is available free of charge to all students, faculty, and staff of the University of Rochester. We are delighted to serve as a source of information and referral, but we do not function as a real estate agent or rental agency. The individual renters must make their choices among available options as well as all business arrangements.

There is no charge for advertising an apartment with CLIC. Many landlords in the Rochester community use CLIC as their exclusive means of advertising; as a result, our directory contains many listings that cannot be found elsewhere.
We invite you to visit our facilities at 200 Gates, Susan B. Anthony Halls, University of Rochester, Rochester, NY 14627-0468. Our hours are 8:30 a.m. to 5 p.m. Monday through Friday. We can be reached at (716) 275-1081/0441.

AUXILIARY SERVICES

University policy requires that parking, food, bookstore, and housing services—services that are used selectively and substantially as matters of individual preference—be sustained by the fees and other charges paid by those who use them, including provisions for depreciation, replacement of equipment, and maintenance. Those services, therefore, are self-supporting and not supported from the University’s tuition and other educational income.

Student Identification Cards

The University provides student identification cards for all students. They are required for charging books from the library, for cashing checks on campus, and for admission to various campus events, certain facilities and activities. The card has the student name, identifying number, signature, and picture. Students at the Medical Center are required to wear identification badges. The regular student identification card serves this purpose; worn as a lapel badge, one side of the card carries the student’s name and photograph. The same cards, with their magnetic and bar codes, serve as keys for admission to residence halls, and to identify those students who have purchased Dining Plan contracts and are entitled to meals at University dining centers. In addition, the cards are useful for security purposes and for positive identification on campus and elsewhere.

Entering freshmen are photographed during the Freshman Orientation and keep their cards through their sophomore year. Juniors, who get new ID cards, are photographed during the second semester of their sophomore year. Transfer students are photographed early in the fall and spring terms.

No initial charge is made for the identification card, but there is a fee for replacement of a lost or damaged card.

Bookstores

The University bookstores provide goods and services that reduce the need for students to leave the campus. In addition to required textbooks and supplies, they stock paperback and hardbound titles in a wide range of subjects and a variety of clothing and other merchandise to serve personal needs. In addition to new texts, the bookstores carry a substantial stock of lower-priced used textbooks.

The principal bookstore is located on the ground floor of the Frederick Douglass Building on River Campus and is open weekdays and Saturdays. Other bookstores are located at the Eastman School of Music and at the Medical Center to serve students who take all or part of their programs there. VISA, MasterCard, and American Express, as well as personal checks, are accepted. If a student is on Dining Option A, the Key Account may be used to make purchases at the River Campus and Eastman School bookstores.

Computer Store

The University has computer stores on campus in Fawver Stadium and in the Medical Center, which carry computing hardware, software, and accessories commonly used by students and faculty. The stores specialize in personal computers of the sort most useful in University programs. Educational discounts are offered to students on the products stocked. Repair services can be arranged with Computer Equipment Services through the stores.

University Dining Service

The University operates its own dining services under the direction of professional food-service administrators. Dining Plan participants may eat at either of the River Campus dining centers (Danforth or Douglas) or at the Eastman School of Music Dining Center. Dining centers serve meals a day Monday through Saturday, and brunch and dinner on Sunday. Meals can be purchased with cash or by using a prepaid Dining Plan (required for all freshmen and all students living in mandatory residence halls).

The cafeteria-style service of the dining centers provides an attractive variety of nutritionally balanced foods—all-you-can-eat—for breakfast, lunch, and dinner. Frequent special meals are offered throughout the year. A snack bar and vending machines are available in Wilson Commons and Eastman Commons. Wilson Commons also offers the Backdoor Pizza in the Common Ground Cafe for fast-food choices either by pickup or delivery. Also, an a la carte luncheon service is available, Monday through Friday, in the Hill Side Restaurant located in the Susan B. Anthony Halls.

"The Corner Store," located in Frederick Douglass Building, offers snacks and grocery items as well as health and beauty aids. It is open seven days a week from 8 a.m. to 9 p.m.

The Medical Center Cafeteria, called The House of the Six Nations, offers breakfast, lunch, and dinner every day.

There are three Dining Plan options:

Option A—Lunch and dinner, every day.

Option B—Lunch or dinner, every day.

Option C—Lunch, weekdays only.

Breakfast is available under all options.

All freshmen on-campus residents, and all undergraduates who live in residence halls that are not equipped for cooking (Quad Residences; Fairchild, Munro, and Kendrick Halls in Hill Court and Eastman Living Center) must subscribe to Dining Option A. Residents of the Towne House must subscribe to either Option A or B. Option C and a commuter dining plan are available to meet the needs of commuter students, though they may choose any of the Dining Plan Options.

The Dining Plan has two parts—the Dining Plan fee and the Key Account. The non-refundable Dining Plan fee entitles the student to use the dining facilities; it covers fixed operating costs such as staff, equipment, and utilities. In addition to this fee, each subscriber establishes a "Key Account" from which he or she can draw to cover the food costs of each meal. The Key Account is debited only when a student eats a meal at Danforth, Douglass, or Eastman Dining Centers. Breakfasts and between-meal snacks at Wilson Commons, from The Corner Store, concessions, the Eastman Commons Orchestra Pit, or Backdoor Pizza also may be debited from Key Accounts. If a student chooses Option A, bookstore and computer store purchases may be made using the Key Account.

If you end the year with a Key Account credit balance, the amount will be refunded as a credit on the term bill.

Dining Plan contracts are for the full academic year and are effective from the day the residence halls open, before classes begin in the fall, through Commencement Day in May, except during academic recesses. For further information on Dining Plans, please call 275-3975.

University Security

We serve an active community of 9,700 full- and part-time students and 11,400 faculty and staff. Each year, we receive about 200,000 calls for service—an average of 600 a day. Our officers provide services to more than 30,000 of these callers and file an additional 7,000 case reports.

Our mission in the Security & Traffic Division is to protect all persons at the University; educate the University community about security issues and personal safety measures; prevent disruption of University activities and misuse of premises; protect University and personal property against theft or abuse; provide a visible, reassuring, and readily accessible presence; and foster beneficial community relations.

Security officers patrol University properties—including the River Campus, Medical Center, South Campus, and Eastman School—24 hours a day, seven days a week. Officers can be identified by their uniforms—dark blue trousers and light blue shirts with the Security & Traffic Division emblem on the left sleeve. Supervisors wear white shirts and blue trousers. Our eight security vehicles are white and display the University logo on their doors.
In addition to responding within about two to three minutes to emergencies—fires, accidents, or physical crimes, for example—the security staff provides a wide range of nonemergency services. These include crime prevention training and awareness; distribution of Security Alert Bulletins (whenever a major crime occurs at or near the University, these bulletins describe the crime and suspect(s) and offer safety tips); victim and witness support; personal safety escorts; assistance to motorists; door openings for people who are locked out; routine building and area checks; security surveys of office space or building renovations; landscaping and exterior lighting evaluations; and lost and found property storage.

In an emergency, dial x13 from any University phone (including 38 service phones located in building entranceways) or pick up—no need to dial—one of 42 Blue Light Emergency Phones located on or near campus walkways. A security dispatcher will send a security officer—who should arrive within two to three minutes—to your location. The dispatcher will also contact local police, fire, or ambulance agencies, if appropriate.

To request one of our nonemergency services, call our nonemergency number, 275-3333, a dispatcher is on hand 24 hours a day to answer calls.

Our administrative offices are in the University Towne House, Suite 1-B, 1325 Mt. Hope Ave., Rochester, NY 14620. Office hours for routine and administrative matters are 8 a.m. to 5 p.m., Monday through Friday. You can also contact our on-duty supervisor 24 hours a day by calling 275-3333.

Office of University and Community Affairs

Located in Todd Union, the Office of University and Community Affairs serves as a clearinghouse for community services programs. Its role is to develop and establish joint programs between community agencies, organizations, and groups and the University. Programs with local schools, libraries, settlement houses, and neighborhood centers have been initiated through this office. Student participation is actively encouraged in these programs.

The issue of diversity is a central focus for the Office of University and Community Affairs. Staff coordinate focus groups for the President's Commission on Diversity and Community. Martin Luther King, Jr., School Day and the United Way Campaign are special programs organized by the office.

University Intercessors' Offices

The intercessors' offices provide a resource for solving problems that do not seem to belong through obvious channels are encouraged to contact the intercessors' offices for assistance. These offices are particularly interested in identifying patterns of problems that indicate a need to change organizational structures or procedures. Helping individuals is an important way to learn what needs to be done to improve the total program. One of the intercessors has primary responsibility for handling concerns regarding sexual harassment and another oversees racial harassment concerns. The intercessors' offices can be reached by phone at 275-4085 or 275-2867.

Lost and Found Offices

A lost and found service is maintained in Wilson Commons for the River Campus. Articles found are turned in there for safe keeping until they can be identified and claimed by their owners. Articles found elsewhere on University premises are turned in to the security headquarters at the Medical Center.

Intercampus and Public Bus Services

The University provides free, scheduled shuttle bus service between River Campus, Medical Center, South Campus, all University apartment buildings, and off-campus parking lots. Free service is provided also between River Campus, Memorial Art Gallery, the Eastman Theatre on Gibbs Street, and the Memorial Art Gallery on Prince Street and on weekdays continues via Brighton-Twelve Corners and west to the University Medical Center and River Campus.

RTS bus No. 12 operates between the 19th Ward and the Medical Center and continues south to stops including Monroe Community Hospital and Monroe Community College.

RTS bus No. 5 (South Avenue) runs between downtown and the University Medical Center.

Automobiles and Parking

Students may bring automobiles to the University, but should be aware that parking spaces for students in residence on the River Campus are in short supply. Monday through Friday from 8 a.m. to 7 p.m. on-campus parking for students, employees, and visitors is permitted by permit or payment at a parking meter. A limited number of metered spaces is available at the rate of $.60 per hour. Commuter students are guaranteed access to parking permits. Resident students may find that the only parking space available to them is in a lot some distance from the campus.

Parking for resident students is offered by lottery to those who preregister. Priority is by class year. It is possible that all space may be in use before all resident students have purchased parking permits. Most resident students make use of the shuttle buses between University properties. Free shuttle buses provide service from the most distant lots to the Visitor Information Center (VIC) from 6:30 a.m. to 11:30 p.m. weekdays when school is in session.

Vehicles displaying any paid parking permit may park in central campus lots not restricted by posted signs between 4 p.m. and 8 a.m. weekdays, and at any time on weekends or University holidays.

For one-day visits to the campus, parking information is available (and permits for the day may be purchased) at the Visitor Information and Parking (VIP) Booth on Wilson
Calls to Rochester and its suburbs are subject to other student phones and University offices. University system, including security services for motorcycles. Parking permits are not required in University buildings and may not be locked to trees; lamp standards, railings, or the like. The annual fee for motorcycles was $11.77 in 1992-93.

Telecommunications Service
All River Campus undergraduate residence hall suites and rooms have telephone instruments, Rolmphones, which connect to the University's telecommunications system. The cost of the basic service, which includes both voice and data communications, is included in the room fees. The voice service provides dial access, without extra cost, within the University system, including security services and emergency medical facilities, as well as other student phones and University offices. Calls to Rochester and its suburbs are subject to local telephone company charges, which are billed directly to each student based on individual use. Calls from off campus to students may be dialled directly to the individual's room or suite telephone, or through the University operator at (716) 275-2121.

All student residence halls telephones have, as a part of the regular service, "PhoneMail," a voice-message service, so one need not have an answering machine. (And, in fact, answering machines will not work in this all-digital phone system.)

Students will also be able to open an account to use the University's low-cost, long-distance network. The charges for these calls will be competitive with, if not less than, other long-distance options. Students are responsible to the University for all long-distance charges they incur on the University's network. They may also use any other long-distance service offered in the Rochester area.

The data communications service consists of an access port which is built into the Rolmphone. Students who connect their personal computers or terminals to the port will have access to the vast array of computer resources available at the University. In addition, students will be able to establish computer communications amongst themselves. The port uses a standard RS-232C interface. A variety of interface cables is available for purchase by students who need them.

University Apartments
Furnished and unfurnished apartments are available for married undergraduates in the University's Goler House, Graduate Maisonettes, University Park, and Whipple Park, all of which are served by University shuttle buses. Upperclass students are housed in the de Kiewiet and the Valentine Towers and in selected Goler House apartments as a part of the River Campus residential life program, at standard academic-year room contract rates. Apartments among the blocks allotted to the undergraduate Residential Life Program are available for undergraduates who must have year-round housing and are prepared to take a lease. Otherwise, the University's apartment facilities are reserved for graduate students.

The Property and Real Estate Management's University Apartments Office is dedicated to assisting students to locate housing on campus. The University Apartments Office is located in the Mt. Hope Professional Building. Office hours are 8:30 a.m. to 5 p.m., Monday through Friday, and may be reached by telephone at (716) 275-5824/275-5826. The mailing address: University of Rochester, University Apartments Office, 1351 Mt. Hope Avenue, Suite 104, Rochester, NY 14620-3990.

Banking Services
Branches of the Chase Manhattan Bank N.A. are located at both the River Campus and at the Medical Center. Each provides full banking services. Check cashing also is provided for students who have Chase Manhattan accounts. Such service also may be provided, up to a $100 maximum, at nominal charge for others with a University identification card.

The River Campus branch is open from 9:30 a.m. to 3:30 p.m., Monday–Thursday, and 9:30 a.m. to 5 p.m. on Friday. The Medical Center branch is open from 9 a.m. to 3 p.m., Monday–Thursday, and 9 a.m. to 5 p.m. on Friday.

In addition to full counter service during normal bank hours, both of the University banks have automatic tellers which are accessible for most regular transactions at night and on weekends and holidays. Other 24-hour automatic tellers are available at Rush Rhees Library on the River Campus and in the lobby of the University's Strong Memorial Hospital.

Postal Services
University Mail/Courier Services operates a Contract Post Office in Todd Union on the River Campus. All classes of mail are handled there, including parcel post and all outside vendor mail (UPS, Federal Express, etc.). Another postal service office is located at the University Medical Center.

Undergraduate and graduate students are rented key-locked postal boxes at rates set by the University. This C.P.U. box number (with University of Rochester, Rochester, NY 14627-XXXX) serves as the student's mailing address and is required for delivery of mail. (Items addressed to residence halls or room numbers must be retouted, retyped and returned to the box.) Box numbers are assigned upon application as soon as students arrive on campus or in advance at freshman and transfer student orientations. Box numbers assigned to students upon arrival are retained; therefore, a student's postal address will remain unchanged from one academic year to the next.

The 1993-94 box fee for an undergraduate student is $15 for the period July 1, 1993, through June 30, 1994.
The Department of Sports and Recreation encourages student participation in intercollegiate athletics, in intramural competition, and in a variety of club, instructional, and recreational activities. The intramural program seeks to attract as many participants as possible. The University has an extensive intramural program, with students accounting for 3,000 individual sign-ups in men's, women's, and coed competition in team and individual sports.

The diverse 24-club sport program accommodates approximately 1,000 students, faculty/staff, and community members. Elective physical education classes are also featured, offering a wide variety of activities. All programs in the Department of Sports and Recreation require registration. Procedures and timeframes are available by calling the Information Desk: 275-7643.

### PHYSICAL EDUCATION CLASSES

**Aquatics**
- Swimming
- Scuba
- Lifeguarding
- WSI

**Health**
- Community CPR
- Advanced First Aid
- Basic Life Support
- Services
- Nutrition
- Stress Management
- Healthy Back

**Fitness**
- Aerobics
- Low Impact
- High/Low
- Combination
- Step
- Running for Fitness
- Self-Defense
- Free Weights
- Nautilus

**Lifetime Sports**
- Racquetball
- Squash
- Golf
- Tennis

**INTERCOLLEGIATE SPORTS**

**Men**
- Baseball
- Basketball
- Cross-country
- Football
- Golf (coed)
- Soccer
- Squash (coed)

**Women**
- Basketball
- Cross-country
- Field Hockey
- Golf (coed)
- Soccer
- Squash (coed)

Students planning to participate in intercollegiate sports should contact the appropriate coach.
ATHLETIC AND RECREATION FACILITIES
The University's River Campus sports complex includes:

Zornow Sports Center: Houses offices for the Department of Sports and Recreation; the Speegle-Wilbraham Aquatic Center, whose pool is 25 meters long and 25 yards wide with a separate well for three-meter and one-meter diving; three regulation basketball courts, which also serve as multipurpose areas for volleyball; four indoor tennis courts; 12 lighted rooftop tennis courts; a lounge, and a meeting room.

Alexander Palestra: Home site for University intercollegiate basketball and volleyball, with permanent seating capacity of 2,200. Also houses coed training room.

Alumni Gymnasium: Offices of the Department of Sports and Recreation, six racquetball courts, five squash racquet courts, weight rooms, and a new fitness center containing Nautilus and aerobic equipment.

Field House: 12,000-square-foot indoor playing surface covered by synthetic turf with a 225-yard polyurethane-surface running track around the perimeter (and extending through a tunnel under the adjoining Palestra). The area is used for activities of most University intercollegiate athletic teams, many intramural and club events, and recreational sessions.

Fauver Stadium: 5,000-seat concrete and brick outdoor stadium, with lights, an all-weather playing field, and a 400-meter eight-lane track. Site of intercollegiate football, field hockey, soccer, track and field, and a full range of intramural, club, and recreational activities. Also houses locker rooms for men and women and a coed training room.

Other Outdoor Facilities: Baseball, large natural grass area used for field sport practices, track throwing events, intramural and club sport play; includes two softball fields with lights.

NOTICE TO FRESHMEN
All students are encouraged to attend the Sports Fair conducted in early September, preceding the first day of class. At the Sports Fair complete information is available concerning recreational opportunities, courses of instruction, intramural and club activities, and varsity sports.
ADMISSION
The University of Rochester welcomes students who are able to take advantage of excellent resources and an outstanding faculty. Undergraduates are admitted as freshmen or as transfer students for full-time or part-time study. Application forms, appointments for interviews, and other information may be obtained by writing to the Office of Admissions, Meliora Hall, University of Rochester, Rochester, NY 14627-0251, by calling (716) 275-3221, or through fax machine (716) 461-4595.

Individual attention is given to each student from the time he or she first becomes interested in the University. A large staff of counselors and many faculty members participate in the advising of applicants and review of applications. Admission decisions are based on a student's high-school work, recommendations from instructors and counselors, verbal and quantitative skills, participation in school and community life, and, for transfer students, college course work already completed.

RECOMMENDED PREPARATION FOR ADMISSION
The University does not use a specific minimum for high-school or college grades or test scores; it does seek students who can grow and mature intellectually through its academic programs and opportunities. Grades and test scores are not the only indicators of potential success. Because secondary schools vary greatly in the diversity and quality of courses which they offer, it is important to know what a student has accomplished within his or her total environment. Therefore, students are evaluated in terms of their individual accomplishments.

The University recommends that students have sound basic preparation in several disciplines. A strong secondary school program usually includes four years of English with continuous practice in writing, four years of social studies, at least two years of a foreign language, three to four years of mathematics, and two or more years of laboratory science. Honors, Regents, or Advanced Placement courses are expected of students in secondary schools offering these programs.

Several concentration programs at Rochester have science requirements. A prospective applicant intending to earn a B.S. degree in chemistry or chemical engineering or a degree in biology should have taken high-school chemistry, and chemistry also is strongly recommended for the applicant who designates a B.S. degree in nursing. Physics is required for admission to the B.S. degree program in physics or in physics and astronomy, and is highly recommended for all prospective engineering concentrators.

INTERVIEWS AND VISITS TO THE UNIVERSITY
The Office of Admissions is open all year on weekdays for interviews or group information sessions and campus tours. Interview appointments are scheduled from 9 a.m. to 4 p.m. In the fall semester, the office is open for interviews or group information sessions most Saturday mornings between mid-September and mid-December. During the spring semester, the office is open most Saturday mornings between mid-February and early May. Weekday visits are preferred, however, so that candidates will have the opportunity to attend classes if they wish.

Prospective and current applicants, as well as interested parents, are encouraged to visit the campus. Visiting students find that informal conversations with admission counselors or student interviewers, academic and career counselors, and faculty members in departments of their interest prove invaluable. Interviewers are knowledgeable about the undergraduate curricula and the various facilities and special programs available to undergraduates.

Students with questions concerning academic departments, student life, or extracurricular activities should write to the Office of Admissions; questions will be referred to faculty or staff members or to students for personal replies. Students planning to visit the campus are urged to call or write to the office in advance of their visit so that appointments can be made with faculty or staff members. During the academic year, the Office of Admissions is often able to arrange overnight accommodations on campus for prospective students. Requests to stay on campus overnight should be made approximately two weeks in advance.

Applicants who live at some distance from Rochester may wish to arrange to have an informal interview with an alumni representative in their area. Please call or write to the Office of Admissions for further information.

TRAVEL INFORMATION
The River Campus is located on Wilson Boulevard at Elmwood Avenue. Motorists coming to Rochester via the New York Thruway from the east should use exit 45, take I-490 to the Goodman Street exit, turn left on South Goodman to Elmwood Avenue, and right on Elmwood to Wilson Boulevard. A right turn on Wilson Boulevard leads to the River Campus and the Admissions parking area, Meliora Lot (see the map on page 210). From the south, take I-390 to exit 16, cross East Henrietta and West Henrietta roads, take East River Road to Kendrick Road, turn right on Kendrick to Lattimore Road, left on Lattimore to Elmwood Avenue, left onto Elmwood to Wilson Boulevard, and proceed as above. From the west, use Thruway exit 47, take I-490 to I-390, and I-390 south to exit 17 (Scottsville Road). Turn left on Scottsville Road to Elmwood Avenue, right on Elmwood to Wilson Boulevard, and left onto Wilson Boulevard, following the map to the Admissions parking area, Meliora Lot.
Rochester is served by American, Business Express, Continental, Delta, Mohawk, Northwest, Trans World Express, United, and USAir airlines. The campus can be reached by taxi from the airport in approximately 10 minutes. The Greyhound and Trailways bus terminal is within walking distance of Main Street East, where Regional Transit Service Bus No. 19 or a taxi may be taken to the River Campus. Transportation to Rochester is also provided by Amtrak.

APPlying TO ROCHESTER
Students may apply to enter Rochester for either the fall or spring semester. Freshman applications should be submitted by November 15 for spring consideration and January 15 for fall consideration. Students wishing an early decision for the following fall should see the instructions below. Transfer applications (see page 199) are reviewed on a rolling admission basis, with no formal deadline for United States citizens or permanent residents.

The following materials are required before the application review can begin: an official copy of a high-school transcript; a recommendation from a counselor or faculty advisor; the SAT or ACT score report, and a completed University or Common Application form including a personal essay.

The University accepts the Common Application in lieu of its own form and gives equal consideration to both. Students may obtain copies of the Common Application from their secondary schools.

Applicants are invited to submit additional instructor recommendations and other materials which may be useful in the application review.

College Entrance Examinations
Applicants for admission are required to take either the Scholastic Aptitude Test (SAT) of the College Entrance Examination Board or the American College Test (ACT) of the American College Testing Program. Both are offered several times a year at centers throughout the world.

Scores from CEEB Achievement Tests are recommended but not required. However, students are urged to take Achievement Tests, particularly in areas such as English, a foreign language, mathematics, and sciences, because the scores indicate the level of achievement in these areas and may prove valuable to both an admitted student and faculty and staff advisors in determining appropriate introductory college courses. For example, students may satisfy the College of Arts and Science foreign language requirement on the basis of a sufficiently high score on a foreign language Achievement Test. Applicants for admission should take the SAT or the ACT no later than February of the final year in secondary school for fall admission or no later than November for spring admission.

Application forms for the SAT may be obtained from secondary schools or the College Entrance Examination Board, Box 502, Princeton, New Jersey 08540, or the Board's Pacific Coast Office, Box 1025, Berkeley, California 94701. Application forms for the ACT can be obtained through secondary schools or by writing to the American College Testing Program, Box 168, Iowa City, Iowa 52240.

Early Decision
Students who decide that Rochester is their first-choice college may apply for an early decision on their applications. Early decision may be requested until February 1. Students applying by November 15 will receive a special early decision financial aid application from the University, if applying for financial aid. If admitted, early decision candidates agree to withdraw all other applications and enroll at Rochester.

If the application is filed by November 15 and completed by November 30, candidates are notified of the decision of the Committee on Admissions by December 15, and if admitted, are expected to make formal acceptance of the offer of admission, including payment of the nonrefundable $400 deposit, by January 15. (Please note that SAT scores from the November test date, though not received until after November 30, are acceptable for early decision review.)

Applications are welcome to request an early decision in writing, and a response will be sent within three weeks of the receipt of all credentials. Admitted students will be expected to submit their deposits within two weeks of the date of notification.

If Rochester is a student's first-choice college, it is to the student's advantage to apply for early decision. Those who receive a "postpone" letter rather than admission are notified that their applications will be reviewed again in early spring with regular applications.

Notification of Admission Decision
Applicants for spring-term admission will usually be notified soon after the application is complete. Applicants for the fall semester will be notified between late March and mid-April. Applicants for financial aid will be notified of financial aid action at the same time as, or shortly after, they are notified of admission. Students requesting a decision on or before a specific date because of special circumstances may receive an earlier notification provided that the application is complete. For fall admission, the University subscribes to the uniform Candidates' Reply Date, whereby admitted students are not required to notify the University of their decision until May 1.

Students who accept the offer of admission submit an enrollment deposit of $400. The deposit is nonrefundable for those who subsequently decide not to enroll, but for enrollees it is deducted from the first tuition bill after the start of classes.

Deferred Admission
Students who are offered admission may request a deferral of their admission for a period of up to one year. During the time of deferral, students may take a limited number of college courses for purposes of enrichment but not, under this arrangement, matriculate as full-time students at another college or university. Students deciding to attend another college for a semester or longer may at a future date reactivate their applications for transfer admission consideration. Students granted deferred admission must pay the nonrefundable deposit to reserve a place in the next class.

Financial aid decisions are not deferred. Students granted deferred admission must resubmit an application for financial aid.

ENGINEERING AND APPLIED SCIENCE
Prospective students interested in pursuing a degree program in engineering should be sure to indicate this interest on their applications. Students planning to pursue programs of study in engineering are assigned faculty advisors from the College of Engineering and Applied Science at the beginning of their freshman year and they may begin taking engineering courses as early as their first semester at the University. Among the benefits for engineers are a strong liberal arts exposure for engineering students, and the better integration of students pursuing a variety of programs of study.

APPLYING FOR ADMISSION TO A DEGREE PROGRAM IN MUSIC
There are two kinds of bachelor's degree programs in music at the University and, hence, two different application procedures. The College of Arts and Science offers, in cooperation with the Eastman School of Music, the Bachelor of Arts (B.A.) degree with a concentration (major) in music (see page 102). This degree program addresses students who can meet both the intellectual and musical challenges of a course of study that emphasizes the broad experience of a liberally educated person. The concentration in music comprises a balanced program of academic study, private instruction, and ensemble experience. Although the concentration is a
During Freshman Orientation this information is used in course selection. Specific questions may be addressed to the Director of Orientation Programs, 312 Lattimore Hall.

FOREIGN STUDENTS
The University of Rochester welcomes applications from foreign students. Admission is competitive, and students needing financial assistance should be aware that financial aid for international students, if it is available, is typically limited to less than one-half of the University's tuition costs. Foreign applicants are required to submit the same application materials and to take the same entrance tests as United States citizens. All correspondence and applications should be sent by air mail, or fax machine (716) 461-4595. Because the SAT and the ACT may not be given as often abroad, and scores take longer to be reported, foreign students are advised to write to the American College Testing Program or to the College Entrance Examination Board as soon as they decide to apply to the University to ascertain where and when the next test is offered in their area. The SAT and ACT should be taken no later than January for fall admission consideration. Because it is often difficult to interpret and evaluate secondary school transcripts from abroad, translations and explanations of grading systems should be submitted when necessary. The Ordinary and Advanced level examinations administered in many countries are strongly recommended when available; the results will be considered both for admission and for placement.

Applicants whose native language is not English are strongly urged to submit scores from the Test of English as a Foreign Language (TOEFL). Students are expected to have a firm command of the English language before they apply; no provisional admission is offered whereby a student may come to the University and spend a semester or a year learning English.

All applicants intending to earn their baccalaureate degree from the School of Nursing are required to submit TOEFL scores. In addition, applicants who are already nurses are required to complete successfully the Commission on Graduates of Foreign Nursing Schools (CGFNS) qualifying examination.

ADVANCED PLACEMENT
Entering students may receive course credit and/or higher-level course placement at the University through the College Entrance Examination Board Advanced Placement Program. Advanced Placement score reports must be forwarded to the College of Arts and Science from the College Entrance Examination Board. As soon as these reports are received, admitted students are notified about placement or course credit.
no formal deadline for submission of an application, it is to the student's advantage to complete an application well in advance of the semester for which he or she is applying. This is especially true for students who are requesting consideration for financial aid and/or on-campus housing.

Application Materials
In addition to Part 1 and Part 2 of the application, transfer applicants should submit official transcripts from each college previously attended; recommendations from the last college attended on a full-time basis; the high-school transcript (or equivalent) and recommendation; SAT or ACT scores; and a catalog or bulletin from each college in order that all previous coursework can be evaluated for transfer credit.

Applicants who have been out of high school five years or more may request the Modified Transfer Admission Application. Under the guidelines of this application, SAT or ACT scores as well as high-school recommendations are not required; however, if available, that information is incorporated into the application review.

Foreign students living outside the United States are required to submit the same documents (translated, if the originals are not in English) and to take the same tests as students living in the United States in order to complete their applications. In addition, applicants whose native language is not English are to submit scores from the Test of English as a Foreign Language (TOEFL).

Academic Review
Emphasis is placed on the most recent semesters of coursework completed at the college level. Applications from candidates who could enter with more than four semesters of transfer credit are generally reviewed by the particular department in which concentration is planned. After reviewing an application, the Committee on Transfer Admissions notifies the candidate of its decision soon after the application is completed. The decision on financial aid is also announced at this time if the financial aid application is complete. All transfer students are encouraged to meet with a member of our transfer admissions staff during the application process to discuss their application status.

Transfer Credit
Courses taken at another college are evaluated individually for transfer credit and placement. Courses which are judged comparable in level and content to coursework offered at Rochester, and completed with a "C-" or better, will transfer for college requirements or for elective credit. When a transfer student applies for a major, the department will designate which transferable courses may be applied toward degree and concentration requirements.

Residency Requirement
The College of Arts and Science and the College of Engineering and Applied Science require a minimum of two semesters in residence. Students must satisfactorily complete at least 12 credits in each of the two semesters in order to be eligible for the bachelor's degree. More than two years of credit will be transferred to an Arts and Science degree only if approval is granted by the intended area of concentration. Summer school coursework taken after transfer to the College of Engineering and Applied Science does not apply towards its residency requirement. (Part-time students in Arts and Science must complete 24 credit hours during one three-year period; this rule is superseded by any residency requirement in force in the student's department of concentration at the time when it might reasonably be applied.)

Transfer students are expected to fulfill all requirements set by the college in which they intend to earn their degree. Students transferring into the College of Arts and Science particularly are reminded that they must demonstrate proficiency in one foreign language before the degree can be awarded. The School of Nursing requires a minimum of 32 nursing credits taken at the University of Rochester. These nursing credits may be taken on a full- or part-time basis.

Housing
Transfer applicants customarily receive a housing assignment from the Office of Residential Life if their deposit and the University housing contract are received by the specified date each year. Students in need of housing whose application process is completed after all available space has been allocated will be offered assistance in securing alternative housing placement. More information regarding this matter is available from the Office of Transfer Admissions, (716) 275-5312.

School of Nursing
Transfer students who wish to complete requirements for the Bachelor of Science degree in nursing should contact the Admissions Office at the School of Nursing, (716) 275-2375, prior to enrollment so that arts and science credits earned elsewhere may be assessed. (Refer to specific course requirements on page 163.) Nursing applicants who transfer into the freshman or sophomore level are admitted through the College of Arts and Science where they are enrolled in a sequence of pre-nursing courses. Upon completing 36 credits (including transfer courses), students declare their concentration with the School of Nursing.

Students currently or previously enrolled in another baccalaureate program in nursing may transfer to the School of Nursing on a space-available basis. All requests from other programs will be reviewed by the Associate Dean for Academic Affairs. In addition to meeting admission criteria, a nursing student must submit a written recommendation from the academic administrator of his or her current or previous nursing program, and course outlines of any nursing coursework completed. An interview may also be required.

Campus Visits
Students who are considering transfer are urged to visit Rochester in order to become familiar with the campus and the University
 Persons wishing to take courses for general college dean prior to the first day of classes. Services appropriate admissions procedures. Please refer to student, if desired, will be subject to an enrichment or on a trial basis may do so.

AND SPECIAL STUDENTS

Students who with- draw from the University or are separated for any reason and who wish to re-enter should apply through the Office of Transfer Admissions. Applications for readmission are reviewed by representatives of the various colleges. Students who appear ready to resume their programs are generally approved for readmission, subject to space limitations in departments and residence halls. Applications for readmission should be filed at least a month before the beginning of the term in which the student plans to re-enter.

FINANCIAL AID

Transfer students in need of financial assistance should file the University of Rochester's application for financial aid, which is contained in the Part 2 application folder, and the College Scholarship Service's Financial Aid Form (FAF) and the Free Application for Federal Student Aid (FAFSA). A financial aid application will be sent to students who request the modified application materials. Financial aid transcripts, documenting all sources of financial aid received from previous colleges, must also be filed by all financial-aid applicants. It is recommended that students requesting financial assistance complete the application early. For additional information, see the section on financial aid on page 203. Applicants should note especially the Meliora Transfer Scholarship awarded to students who demonstrate financial need and high academic success.

READMISSION

Students who withdraw from the University or are separated for any reason and who wish to re-enter should apply through the Office of Transfer Admissions. Applications for readmission are reviewed by representatives of the various colleges. Students who appear ready to resume their programs are generally approved for readmission, subject to space limitations in departments and residence halls. Applications for readmission should be filed at least a month before the beginning of the term in which the student plans to re-enter.

PART-TIME STUDENTS AND SPECIAL STUDENTS

Persons wishing to take courses for general enrichment or on a trial basis may do so without formal admission procedures. However, subsequent matriculation as a regular student, if desired, will be subject to an appropriate admissions procedure. Please refer to The Part-Timer's Guide to Registration & Services for details. Students who wish to change their status from full-time to part-time, or vice versa, need to inform their college dean prior to the first day of classes.

Tuition will be adjusted for students who change their time status after classes begin. Persons wishing to explore the options available to part-time students are welcome to visit the College Center for Academic Support, 312 Lattimore Hall, between the hours of 9 a.m. – 6 p.m. Mondays, Tuesdays, and Thursdays, and 9 a.m. – 5 p.m. Wednesdays and Fridays.

Special guidance in planning a program of study in engineering is available from the Office of the Dean, College of Engineering and Applied Science, 401 Dewey Hall. Part-time students are encouraged to write or telephone for appointments.

The category special student includes those full-time students desiring to pursue coursework not leading to a degree, those who wish to complete professional school prerequisites, and "visiting" students currently enrolled in another college who wish to attend the University only for a term or a year. Preprofessional advising is available to those special students planning to complete requirements at the University for admission to medical or dental school, law school, or other graduate and health professions programs (refer to Career and Counseling Services). Prospective special students are welcome to direct their inquiries to the Office of Transfer Admissions.

SCHOOL OF NURSING—ADMISSION

Prospective freshmen interested in pursuing a degree program in nursing should be sure to indicate this interest on their application. Students planning to pursue a degree in nursing are assigned faculty advisors from the School of Nursing at the beginning of their freshman year or as soon as they officially declare nursing as their major course of study. Students from other institutions planning to apply for junior standing should seek information about courses which meet admission requirements during their first two years of study. They may obtain application forms and information concerning admission from the Office of Transfer Admissions, (716) 275-3312, or the School of Nursing Student Affairs Office, (716) 275-2373.

Requirements for admission to the professional course of study require the successful completion of specified liberal arts and science courses in the following subjects: English (writing and thinking); human anatomy and physiology; psychology (1 semester general; 1 semester developmental); statistics; microbiology (including laboratory); humanities (2 semesters); chemistry (1 semester, including laboratory); sociology (1 semester).

Students may transfer to the University of Rochester at all levels. However, the professional course of study begins in the junior year. A minimum of 32 nursing credits must be completed at the School of Nursing. Students who wish to transfer to the School of Nursing should contact the School of Nursing Student Affairs Office.

Physical education courses required in other colleges attended are not accepted for transfer credit.

The minimum academic standing expected of all applicants to the School of Nursing is 2.0. Courses for transfer from outside the University of Rochester must be completed with a grade of "C-" or above. Required courses cannot be taken with the S/F option.

The School of Nursing has articulation agreements with several colleges and universities to facilitate transfer of students into the upper-division nursing program. Students should contact the Assistant Dean for Student Affairs at the School of Nursing, and/or the Health Professions Advisor at the school of his or her choice to determine admission requirements.

The School of Nursing requires evidence of a strong desire to make nursing a career, together with evidence of aptitude for such a career.

Students, especially those taking part-time study over a period of time, are advised to check periodically regarding degree requirements and the acceptability of courses to be offered for admission to the nursing major.

REGISTERED NURSES—REGULAR ADMISSION

Registered nurses who have graduated from diploma or associate degree programs and who seek admission to the School of Nursing may obtain information concerning admission from the School of Nursing, Office of Admissions, (716) 275-2375. Under the admission procedures just described RNs are eligible for transfer credit through transcript evaluation and specified nursing examinations. It is possible for registered nurses who study full time to complete the baccalaureate program in one year.

A combined baccalaureate-master's degree program in nursing is available for select registered nurses with defined career goals. Specific details concerning admission criteria and coursework are available through the School of Nursing, Office of Admissions, (716) 275-2373.
Financing an Education

Expenses to be anticipated in determining the cost of an education at Rochester can best be understood as a combination of fixed and variable expenses. Fixed costs are those payable directly to the University for tuition, fees, and room and board for those living on campus and participating in a University board plan. Those costs and information relevant to their payment are summarized below.

Variable expenses are those which an individual student incurs over and above those fixed costs. The largest components of variable expense are likely to be books and transportation. Amounts spent for clothing, recreation, and personal items will differ widely according to the personal circumstances and spending patterns of individuals.

On the basis of past experience and for purposes of assessing the need for financial aid, the Financial Aid Office can estimate the average cost to an undergraduate for one year. Generally referred to as the estimated student budget, this figure for students living on campus during the 1993-94 academic year is $25,000 plus travel. Commuting students who live with their parents in the greater Rochester area may estimate an annual budget of $20,925.

Fixed Costs
Tuition for full-time undergraduates is $16,950 for the 1993-94 academic year. A room in a campus residence, including linen service, double or triple occupancy, is $3,806 per year. The most comprehensive board plan is $2,480 per year. Students who live with their parents in the greater Rochester area may estimate an annual budget of $20,925.

NOTE: Variable expenses incurred by nursing students include the following: uniforms, books and supplies, and expenses in connection with field trips or clinical experience; including transportation to and from clinical settings. These expenses may vary from $500 to $600 per year.

NOTE: Tuition may be adjusted as a result of changes in case of withdrawal. See page 210. Adjustment Charges. Withdrawal, and Inactive Status.

NOTE: Noncredit course fees. All persons attending noncredit courses must pay fees as announced for these courses.

Payment Plans
Undergraduate students are billed on the basis of charges for a full academic year. The University offers a choice of an eight-payment plan, a two-payment plan, or a one-payment plan. Financial aid is credited and the net balance is payable in accordance with the payment plan selected by the student. Late payment penalties are assessed on payments not received by the due date. Postdated checks submitted cannot be held for deposit. Students who are delinquent in their payments are not allowed to register for the next semester, receive transcripts, or participate in the Housing Lottery. Students with delinquent balances at the end of the fall semester may be withdrawn from the University.

A Prepaid Tuition Plan is available which enables incoming freshmen to prepay four years of tuition at the tuition rate in effect during the year of their initial enrollment at the University. Financing is available for this plan through the SHARE Loan program, described in more detail on page 205. Students other than freshmen may prepay tuition at the beginning of the fall term for the remainder of their undergraduate years at the tuition rate in effect at the time prepayment is made.

Students interested in the Prepaid Tuition Plan or wishing further information about the payment options may request details from the Bursar's Office.

Detailed information about financial aid follows. In addition, parents may wish to investigate time payment plans available through commercial lenders and local banks to pay for University education costs.

FINANCIAL AID
Recognizing that the cost of a quality education is high, the University has made a commitment to provide a sound program of financial aid for undergraduate students enrolled in degree-granting programs. Financial aid awards administered directly by the University, including scholarships, grants,
A general discussion of student aid follows. Additional information is available from the Financial Aid Office. Our brochure, *Putting It All Together*, provides a comprehensive discussion of financial aid, including eligibility and application procedures for many specific aid programs. This publication is available upon request.

**Making Application**

Applicants for financial aid must complete the financial aid section of the application for admission and must submit the Free Application for Federal Student Aid (FAFSA) along with the Financial Aid Form (FAF) to the College Scholarship Service. The FAF is usually available from the secondary school; copies also may be obtained from the Financial Aid Office. Freshman aid applicants should submit the required forms by January 31. Transfer aid applicants should submit the forms at the same time they submit admission applications and also must provide documentation of all sources of financial aid received at all colleges previously attended. All applicants who are not United States citizens or permanent residents should file the International Student Financial Aid Application instead of the Financial Aid Form. This application is available from the Financial Aid Office.

**Basis for Award and Renewal of Financial Aid**

Most aid awards, including University scholarships, are based on the applicant's need, after expecting a reasonable contribution from the student and parents toward meeting educational costs. Within need, however, the proportion of scholarship assistance to loan or work will reflect the student's merit and special talents. Applicants are considered for all types of scholarships, loans, and employment for which they are qualified and eligible.

The amount of financial assistance offered is subject to subsequent adjustment if the applicant receives additional aid outside that which is under the direct administration of the University, or if changes in financial need become apparent. Students are expected to submit the appropriate applications for all outside awards for which they qualify. An Acceptance of Financial Aid document is required of those students who decide to enroll.

Aid awards are reviewed annually, and a renewal application for the subsequent academic year must be submitted by March 31. In the review of upperclass applications, the University takes into consideration continuing financial need, and academic achievement at a level which assures satisfactory completion of degree requirements. In the determination of financial need, all resources available to the student to help meet college costs are considered in the decision to continue University-administered financial assistance.

Assuming that the student continues to demonstrate at least the same level of need, University scholarships ordinarily are continued at their original dollar amount for a maximum of eight semesters for students entering as freshmen in the fall term. Transfer students are eligible for renewed scholarship consideration based upon the number of semesters remaining between entrance and the anticipated graduation date (class year designation) established at the time of enrollment. With the exception of students who were separated by the University, financial aid recipients who withdraw are eligible for continuation of assistance upon completing all requirements for readmission. The amount of aid will depend on the availability of funds and the student's need and will not necessarily be equal to a previously held award. Students with a previous educational loan in default status are not eligible for renewal of aid.

**Verification of Financial Information**

The University is required to document the financial circumstances of federal fund recipients and must adhere to regulations governing federal awards, particularly with regard to the eligibility of applicants according to financial need.

For these reasons, Rochester has joined other universities in requiring verification of financial information through submission of a copy of the preceding year's Federal Income Tax Return. Specific instructions regarding this requirement are included in the award letter.

**TYPES OF FINANCIAL ASSISTANCE**

### UNIVERSITY SCHOLARSHIPS

Scholarships administered by the University include general and endowed scholarships and special awards made under the sponsorship and annual support of specific individuals or groups. Students applying for aid are considered for all scholarships for which they are eligible.

**Alumni Scholarships.** Interested students must be nominated by one of the University of Rochester Volunteer Admissions Network Committees throughout the United States and abroad. Final selection of recipients from among those nominated will be based on academic merit and financial need. Names of alumni volunteers are available upon request from the Office of Admissions. An alumni interview is required by February 19.

**University of Rochester AHORA Scholarships.** Winners selected from among residents of Puerto Rico and Monroe County, New York.

**Mellora Transfer Scholarships.** Winners are selected based on academic merit and financial need.

**Phi Theta Kappa Scholarships.** Awarded to needy transfer students who are members of the Phi Theta Kappa honor society.

Certain honoraty scholarships, based upon superior qualifications, provide a minimum stipend without regard to need. Honorary achievement scholarships of particular distinction include:

**National Merit Scholarships.** Awarded to entering freshmen on the basis of the annual National Merit Scholarship Corporation qualifying test. In addition to corporation and foundation sponsors, the University also sponsors renewable scholarships to selected finalists who designate Rochester as their college choice.

**University of Rochester-Urban League Scholarships.** Winners are selected from among students nominated by participating chapters of the Urban League throughout the United States on the basis of academic achievement and demonstrated leadership qualities.

**Bausch & Lomb Science Award.** Awarded by many high schools, the prestigious medal also enables highly qualified students to be considered for special scholarship assistance.

**Kodak Young Leaders Award Program.** Awarded by many high schools, the prestigious recognition also enables highly qualified students to be considered for special scholarship assistance.

**Xerox Humanities/Social Science Award.** Awarded by many high schools, the prestigious recognition also enables highly qualified students to be considered for special scholarship assistance.

**Wilson Scholarships.** Students selected for these prestigious awards are among the strongest applicants to the University. Selection is based on both academic and nonacademic achievements. No special application is required.

**NROTC Scholarships.** Scholarship assistance is available from the United States Navy for students enrolled in the NROTC Program. NROTC students enlisting in 1991 and beyond will also be eligible for additional gift assistance to cover the cost of a room on campus. See page 105 (Naval Science) for further information.
FEDERAL FINANCIAL AID*

The University is an approved participant in the Federal Perkins Loan, Federal Stafford Loan, Federal Nursing Student Loan, Federal Work-Study, Federal Pell Grant, and Federal Supplemental Educational Opportunity Grant programs of the federal government. Approved by acts of Congress, these programs make funds available to United States citizens or permanent residents for grants, loans, and campus employment. With the exception of Federal Pell Grants and Federal Stafford Loans, the administration of these federal student aid funds rests with the University, however, and recipients are selected by the Financial Aid Office. Preference is given to applicants with the greatest financial need, and continuation of aid from this source depends upon annual Congressional appropriations.

The Federal Pell Grant is an entitlement program not under the direct administration of the University, which does not select recipients nor determine eligibility. This program makes direct grants to matriculated undergraduates who qualify solely on the basis of financial need. Instructions for applying for Federal Pell Grants are available from secondary schools and also are included with the Free Application for Federal Student Aid (FAFSA).

LOAN PROGRAMS

Educational loans as a means of self-help toward meeting college costs have increased markedly in recent years. With few exceptions, student loans offer the advantage of deferred repayment until the completion of studies. Loan programs commonly used by Rochester undergraduates include:

Federal Perkins Loans. Loans from this federal program are authorized by the Financial Aid Office. Repayment begins nine months after completion of studies at 5 percent interest (6 percent for loans made prior to 1988-89). Similar to Federal Perkins Loans, specified deferment provisions are available. Eligibility restricted to U.S. citizens or permanent residents.

Federal Stafford Loan Program. This federal program makes loans of up to $2,625 per year to freshmen, $3,500 per year to sophomores, and $5,500 per year to juniors and seniors. Aggregate undergraduate borrowing is limited to $23,000. For students who demonstrate financial need, interest and principal will be deferred during the in-school and grace periods. Students who do not demonstrate financial need are eligible for unsubsidized loans, with interest accruing during the in-school and grace periods. Students borrowing for the first time on or after November 1, 1992, will pay a variable interest rate (91-day T-bill + 3.10 percent) not to exceed 9 percent. Although authorized by federal legislation, the Federal Stafford Loan Program is subject to individual state and lender regulations. Further information and applications are available from hometown lenders such as banks, savings and loan associations, or credit unions.

Federal Supplemental Loans for Students (SLS). A federal program designed for graduate students and undergraduates no longer dependent upon parents. Loans up to $4,000 for freshmen and sophomores and $5,000 for juniors and seniors are available at a variable interest rate (52-week T-bill + 3.10 percent) not to exceed 11 percent. Although interest begins to accumulate immediately, principal payments can be deferred and interest capitalized while the student is enrolled at least half time.

University Loans. The University itself makes a limited number of loans available to students needing further assistance to meet educational costs. These loans, with interest at 9 percent, may be repaid over a period of five years following graduation, with a minimum repayment of $30 per month. Special arrangements may be made to defer repayment during periods of full-time graduate study.

PARENT LOAN PROGRAMS

Federal Parent Loans for Undergraduate Students (PLUS). This federal program provides up to the yearly cost of education less financial aid at a variable interest rate (52-week T-bill plus 3.10 percent) not to exceed 10 percent to parents of financially dependent students. Repayment of interest and principal begins immediately with up to 10 years to repay.

SHARE Loans. This program allows creditworthy borrowers $2,000 to $20,000 per year to support, or up to four years of tuition to finance the University's prepaid tuition plan. Both fixed and variable interest rates are available, with a home-equity option available to allow families to preserve the tax-deductibility of their interest payments. Repayment begins immediately with up to 20 years to repay.

PART-TIME EMPLOYMENT

Students may receive Federal Work Study as part of their total aid award. Earnings through Federal Work Study are paid directly to the student at a rate dependent on the specific job held. Ordinarily 10 to 15 hours per week is a suggested work load for students who seek to earn the amount awarded. Opportunities are also available to students without Federal Work Study funding who wish to work on campus. The Center for Work and Career Development is the coordinating center for on-campus work information. See the section on Career and Counseling Services for more information on these programs.

SCHOOL OF NURSING EXTERNSHIPS

Upon completion of the sophomore year, University of Rochester School of Nursing students are eligible to apply for summer positions as Nurse Externs in Strong Memorial Hospital, where they work either part time or full time at an hourly rate. Frequently nursing students continue their work as externs on a part-time basis throughout the remainder of their program.

ASSISTANCE FROM OTHER SOURCES

Applicants for financial aid also are urged to seek information concerning their eligibility for assistance from outside sources such as state scholarship programs (New York State Tuition Assistance Program for New York State residents), Veterans Administration benefits, the Office of Vocational Rehabilitation, and local community agencies, corporations, foundations, or similar organizations. Application instructions and other conditions affecting receipt and retention of outside scholarships and grants will vary among sponsors, and applicants therefore must be aware of acceptable procedures.

Students receiving funds from federal or New York State financial aid programs must meet standards of satisfactory academic progress and timely pursuit of a program of study in order to assure continuation of their awards. Additional information about these standards is available from the Financial Aid Office or the Office of the University Registrar.

*Eligibility requirements, terms, conditions, and amounts of federal student financial aid are subject to sudden revision by Congress. Descriptions of federal aid programs included in this publication, therefore, may not be applicable at the time of enrollment.

Furthermore, 18-year-old male applicants are reminded that current law requires registration with Selective Service prior to the disbursement of federal grants and loans.
Students are expected to abide by the rules of the University and its faculties and to conduct themselves in accordance with accepted standards of good citizenship, honesty, and propriety, and with proper regard for the rights of others. When the University delegates judicial and disciplinary responsibilities to faculty, staff, or student groups, students must abide by their decisions. Of course, students must obey federal, state, and local laws as would any other citizens.

The following paragraphs indicate some of the standards expected of the Rochester student. More specific regulations are to be found in the University's "Standards of Conduct and Procedures," the University statement on harassment and hazing, the room and board contract, the University's parking regulations, and the policy statements issued by the various deans' and directors' offices and student activities centers.

Disciplinary sanctions up to and including suspension, expulsion, or termination may be imposed upon members of the University community for:

1. Academic cheating or plagiarism,* furnishing false information to the University or to members of the University community, forgery, alteration or misuse of University documents, records, or identification cards, or violation of fire safety regulations.

2. Acts which are illegal under the law are also violations of University regulations. These would include, but are not limited to, theft; disorderly conduct; computer crime; manufacture, sale, possession, or distribution of illegal drugs, including alcohol; rape; possession or use of firearms or explosive materials; assault or battery; vandalism; reckless endangerment of other persons; unauthorized possession of master keys; and failure to comply with reasonable requests of University officials in performance of their duties.

INVENTORY OF REGISTERED PROGRAMS

The New York State Education Department has authorized the University of Rochester to offer the undergraduate-level programs which appear in the following inventory. A listing of graduate programs may be found in the Official Bulletin: Graduate Studies. Programs offered at the Eastman School of Music may be found in the Official Bulletin: Eastman School of Music.

UNIVERSITY RECORDS

The University policy on student records is available to students and their parents through the Office of the Vice President and University Dean of Students.

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*Plagiarism is more explicitly defined in the Policy on Academic Honesty, which also delineates the procedures for adjudicating such charges.

B = provisional teacher certification.
### Program Hegis Reports to Parents

Grade reports and general announcements about events at the University will be sent to parents or guardians of all dependent students.

It is the policy of the University to consider all matriculated undergraduate students dependent unless they formally declare their independence, either at the time of enrollment or subsequently through application to the dean's office of their college.

Unless otherwise directed, reports concerning dependent students will be sent to the parent(s) or guardian(s) at the address designated on the registration materials at the time of enrollment.

If divorced or separated parents wish to receive individual mailings of grade reports and general announcements, the student should so advise the registrar's office (River Campus and School of Nursing students, Office of the University Registrar; Eastman School students, the Eastman School Registrar).

Notification of a change of address, or of a change in the designation of the parent who is to receive University mailings, should be made by the student to the appropriate registrar's office.

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*B* = provisional teacher certification.
TRUSTEES
Robert B. Goergen, Chair
Dennis O'Brien, President

Carl Angeloff
William Balderston III
Ernest A. Bates, M.D.
Alan R. Batkin
Ronald L. Bitmer
C. William Brown
Paula P. Brownlee
Colby H. Chandler
John M. Clary
Edwin I. Colodny
Angelo A. Costanza
Jeanne Sullivan Cushman
Allan E. Dugan
Robert B. Frame
Myra Gelband
Bernard R. Gifford
Daniel E. Gill
James S. Gleason
Elliott W. Gumaet, Jr.
Edmund A. Hajim
Karen Noble Hanson
Alan F. Hildiker
David T. Kearns
Ronald B. Knight
Norman P. Leenhouts
Joseph P. Mack
Martin E. Messinger
Bruce H. Moses
Lois Newman Orchard
Robert M. Osieski
C. Woodrow Ree, Jr.
Arthur M. Richardson
William D. Ryan
Graham Wood Smith
Hugo F. Sonnenchein
Alan J. Underberg
Kay R. Whitmore
Mary-Frances Winters
G. Robert Witmer, Jr.

SENIOR TRUSTEES
Everett S. Ascher
Richard J. Collins, M.D.
Virginia A. Dwyer
Walter A. Fallon
Jeremiah Kaplan
John M. Keil
Marion Todd Lovejoy
Gilbert G. McCurdy
George M. Mullen
Andrew H. Neilly, Jr.
George E. Pake
William E. Simon
Robert F. Sykes
William G. von Berg
William B. Webber

LIFE TRUSTEES
Willard M. Allen, M.D.
Alfred C. Aman, Jr.
Mercer Brugler
Wilmot R. Craig
Max M. Farash
Janet Phillips Forbes
Donald A. Gaudion
Emanuel Goldberg
Arthur R. Kantrowitz
Jacob Koomen, Jr., M.D.
Robert P. Larson
William F. May
Mitchell W. Miller
Joseph E. Morrissey
Ernest L. Reeval
Robert H. Scheerschmidt
Robert L. Sproull
William S. Vaughan
Margaret D. Waasdorf
W. Allen Wallis
Robert L. Wells
Marie Curran Wilson
Robert A. Woods
Alejandro C. Zaffaroni

ADMINISTRATION
President . . . Dennis O'Brien
Provost . . Brian J. Thompson

Executive Vice President and
Treasurer . . . Richard W. Greene
Vice President and University
Dean of Students . . .
Paul J. Burgett
Vice President for Administration . . .
Donald K. Hess
Vice President and Vice Provost
for Health Affairs . . .
Robert J. Joynt
Vice President and General Secretary . . .
Roger D. Lathan
Vice President for External Affairs and
Senior Counsel to the President . . .
Richard P. Miller, Jr.
Vice President for Budgets and
Financial Planning . . .
Ronald J. Paprocki
Vice President for Enrollments,
Placement, and Alumni Affairs . . .
James J. Scannell
University Buildings

Key
1. Rush Rhees Library
2. Morey Hall*
   Eastman Kodak Colonnade
3. Lattimore Hall*
4. Strong Auditorium*
5. Schlegel Hall*
6. Dewey Hall*
7. Hoyt Hall*
8. Bausch & Lomb Hall*
9. Meliora Hall*
10. Harkness Hall*
11. Gavett Hall*
12. Carol G. Simon Hall*
13. Hopeman Engineering Bldg.*
14. Taylor Hall*
15. N.Y. State Center for Advanced Technology
16. Wilmot Bldg.*
17. Hylan Bldg.*
18. Hutchinson Hall*
   Hubbell Auditorium*
   Lander Auditorium
19. Computer Studies Bldg.*
20. Administration Bldg. *
21. Interfaith Chapel*
22. Todd Union*
23. Delta Kappa Epsilon
24. Alpha Delta Phi
25. Theta Chi
26. Psi Upsilon
27. Quad Annex
28. Sigma Alpha Mu
29. Sigma Chi
30. Medieval House*
31. Drama Center*
32. Burton Hall
33. Crosby Hall
34. Hoeing Hall
35. Lovejoy Hall
36. Tiernan Hall
37. Gilbert Hall
38. Wilson Commons*
39. Frederick Douglass Bldg.*
   Bookstore
   Faculty Club
   Dining Center
40. Alumni Gymnasium*
41. Alexander Palestr*
42. Field House*
43. Zornow Sports Center*
44. Fauver Stadium*
45-49. Susan B. Anthony Halls*
45. Gates Hall
46. Morgan Hall
47. Hollister Hall
48. Gannett Hall
49. Danforth Dining Center
50. Spurrier Hall*
51. Sage Art Center*
52-53. Founders Court
52. Anderson Tower
53. Wilder Tower
54-59. Hill Court
54. Slater House
55. Munro House
56. Kendrick House
57. Gale House
58. Fairchild House
59. Chambers House
60. Maintenance-Transportation Bldg
61. 575 Mt. Hope Ave
62. 500 Mt. Hope Ave
63. 630 Mt. Hope Ave
   (Peter Barry House)
64. 668 Mt. Hope Ave
   (Ellwanger & Barry Bldg.)
65. 692 Mt. Hope Ave
   (Patrick Barry House)
66. Fairbank Alumni House
67. Towne House*
68. Computing Center
69. Mt. Hope Professional Bldg.
70. Mail Services Bldg.
71. Golter House*
72. Eastman Dental Center
   (independent affiliated agency)
73. Strong Memorial Hospital*
74. Gannett Emergency Center*
75. Supplies & Accounts Bldg.
76. Cancer Center*
77. Department of Biophysics*
78. University Health Service*
79. Department of Orthopaedics*
80. Department of Psychiatry*
81. Central Utilities Plant
82. Medical Center Annex
83. Medical Education Bldg.*
84. Helen Wood Hall*
85. University Park*
86. Valentine Tower*
87. de Kiewiet Tower*
88. Graduate Maisonettes*
89. Nuclear Structure Research Laboratory
90. Center for Optoelectronics
   and Imaging
91. Laboratory for Laser Energetics
92-93. River Road Bldgs.
92. River Road Residence*
93. River Road Laboratory*
94. Whipple Park Apartments*

1. Rush Rhees Library: Departments of History, Religion and Classics, and Film Studies; principal library for the River Campus.
2. Morey Hall: Departments of English and Art and Art History, Frederick Douglass Institute for African and African-American Studies, Department of Naval Science, Office of Vice President and University Dean of Students, Office of Minority Student Affairs, Higher Education Opportunity Program, and International Student Office.
3. Lattimore Hall: Margaret Warner Graduate School of Education and Human Development, Office of the Dean and College Center for Academic Support of the College of Arts and Science, Career Services and Placement Center, Counseling and Psychological Services, College Center for Study Abroad and Interdepartmental Programs, Learning Assistance Services, Orientation Office, Susan B. Anthony Center, a 153-seat auditorium, and classrooms and seminar rooms.

*Description on pages 211-212.
4. **Strong Auditorium**: Two halls, seating 1,060 and 480 persons, used for lectures, films, stage productions, and concerts.

5. **Schlegel Hall**: William E. Simon Graduate School of Business Administration M.B.A. Program, Computing Center, placement offices, Executive Development Program, and classrooms.

6. **Dewey Hall**: Administrative offices of the College of Engineering and of the Vice President for Computing; Department of Electrical Engineering; William E. Simon Graduate School of Business Administration administrative offices and faculty.

7. **Hoyt Hall**: Center for Audio-Visual and Technical Services, and 350-seat auditorium for lectures, meetings, and conferences.

8. **Bausch & Lomb Hall**: Department of Physics and Astronomy.

9. **Meliora Hall**: Office of Admissions, Office of Financial Aid, Department of Psychology, Center for Visual Science, River Campus Copy Center, Student Employment Office, administrative offices, and general classroom facilities.

10. **Mankress Hall**: Offices of the Departments of Anthropology, Economics, and Political Science.

11. **Gavett Hall**: Offices, classrooms, and laboratories of the Department of Chemical Engineering, and laboratories of the Department of Mechanical Engineering and of The Institute of Optics.

12. **Carol G. Simon Hall**: Teaching laboratories of The Institute of Optics; Department of Foreign Languages, Literatures, and Linguistics; Department of Philosophy; William E. Simon Graduate School of Business Administration faculty and Ph.D. Program.

13. **Hopeman Engineering Bldg.**: Offices, classrooms, and laboratories of the Departments of Electrical Engineering and Mechanical Engineering.

14. **Taylor Hall**: University Computing Center terminal facility.

15. **Wilmot Bldg.**: Offices, seminar rooms, and laboratory facilities for The Institute of Optics.

16. **Hylan Bldg.**: Classrooms, conference rooms, commons rooms, seminar rooms, offices of the Departments of Mathematics and Statistics, and Office of Research and Project Administration.

17. **Hutchison Hall**: Classrooms, lecture halls, laboratories, offices, and commons rooms of the Undergraduate Program in Biology and Chemistry, the Departments of Biology, Chemistry, and Geological Sciences, and a greenhouse complex.

18. **Hubbell Auditorium**: 483-seat auditorium in Hutchison Hall for lectures, special meetings, and conferences.

19. **Lander Auditorium**: 148-seat auditorium in Hutchison Hall.

20. **Administration Bldg.**: University administrative offices and Offices of the Registrar and the Bursar.

21. **Interfaith Chapel**: Center for campus religious activities and chaplains' offices.

22. **Todd Union**: Noteworthy as one of the first student unions in the United States, essentially replaced by Wilson Commons.

23. **Dewey Hall**: Houses the offices of the River Campus Music Department, Office of University Community Affairs, a U.S. post office, a bank, Todd Theater, and two student radio clubs, WRUR-AM and FM and K2ZWI (Amateur Radio).

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29. **Frederick Douglass Bldg.**: A student dining center, meeting rooms, University bookstore, and Faculty Club.

30. **Alumni Gymnasium**: Office of Sports and Recreation, squash and racquetball courts, fitness center, and weight rooms.

31. **Alexander Palestra**: Home site for University intercollegiate basketball and volleyball, with permanent seating capacity of 2,200.

32. **Field House**: 12,000-square-foot indoor playing surface covered by artificial turf, and a one-eighth-mile running track around the perimeter.

33. **Zornow Sports Center**: Offices for the Department of Sports and Recreation, Speegle-Willibrath Aquatic Center, four indoor tennis courts, three combination basketball-volleyball courts, meeting room, locker rooms, and 12 lighted rooftop tennis courts.

34. **Fauver Stadium**: 5,000-seat, concrete-and-brick stadium with artificial turf and lights. Also houses coed training room, and has a 400-meter track encircling playing field. Site of intercollegiate field hockey, football, track and field, and soccer. At the south end of the stadium building are located the River Campus Security and Parking offices and University Computer Sales.

35-49. **Susan B. Anthony Halls**: Undergraduate residence and dining center, infirmary, and Services Division offices.

50. **Spurrier Hall**: Dance studio, music rooms, and Employee Assistance Program.

51. **Sage Art Center**: Teaching and studio facilities for visual arts programs.

57. **Towne House**: East Wing—Medical and hospital services offices, University Security, Properties and Real Estate Management Center Wing—Residence Hall. West Wing—University computing and systems center.


73-74, 76-80, 83. **University Medical Center**: School of Medicine and Dentistry, School of Nursing, Strong Memorial Hospital.

84. **Helen Wood Hall**: School of Nursing Program for Pediatrics, Department of Community and Preventive Medicine, Department of Family Medicine, and classrooms.

92. **River Road Residence**: Housing facilities.

93. **River Road Laboratory**: Includes River Road Auditorium. General University use.
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<td>Radio Station, Student</td>
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<td>Reach for Rochester</td>
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<td>Readmission</td>
<td>201</td>
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<td>Registered Nurses</td>
<td>201</td>
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<tr>
<td>Registered Programs, Inventory of</td>
<td>207-208</td>
<td></td>
</tr>
<tr>
<td>Registration</td>
<td>175</td>
<td></td>
</tr>
<tr>
<td>Regulations, General</td>
<td>207</td>
<td></td>
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<tr>
<td>Religious Services</td>
<td>188</td>
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<tr>
<td>Religion and Classics</td>
<td>125</td>
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<tr>
<td>Repeating a Course for a Grade</td>
<td>179</td>
<td></td>
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<tr>
<td>Reports to Parents</td>
<td>208</td>
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<tr>
<td>Research Facilities, Special</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Research, Undergraduate</td>
<td>23</td>
<td></td>
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<tr>
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<td>26</td>
<td></td>
</tr>
<tr>
<td>Residences, Student</td>
<td>9, 189</td>
<td></td>
</tr>
<tr>
<td>Residency Requirement</td>
<td>200</td>
<td></td>
</tr>
<tr>
<td>Residential Life</td>
<td>189</td>
<td></td>
</tr>
<tr>
<td>Residential Living Center</td>
<td>190</td>
<td></td>
</tr>
<tr>
<td>Retention, Student</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>River Campus</td>
<td>8</td>
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<tr>
<td>Rochester Area</td>
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<tr>
<td>Rochester Early Medical Scholars Program</td>
<td>25, 199</td>
<td></td>
</tr>
<tr>
<td>Rochester Plan Early Selection Program</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Romanian</td>
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<tr>
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<td>203</td>
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<tr>
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<td>17</td>
<td></td>
</tr>
<tr>
<td>Russian</td>
<td>76, 80</td>
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<td>128</td>
<td></td>
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<tr>
<td>Sage Art Center</td>
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<tr>
<td>Satisfactory-Fail Option</td>
<td>178</td>
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<td>204</td>
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<tr>
<td>School of Nursing, see Nursing Secondary School Teaching</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>191</td>
<td></td>
</tr>
<tr>
<td>Senior Scholars Program</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Senior Year in Absentia</td>
<td>179</td>
<td></td>
</tr>
<tr>
<td>Sign Language, American</td>
<td>77</td>
<td></td>
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<tr>
<td>Sociology</td>
<td>129</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>76, 81</td>
<td></td>
</tr>
<tr>
<td>Special Academic Opportunities</td>
<td>23, 176</td>
<td></td>
</tr>
<tr>
<td>Special Degree Programs</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Sports and Recreation</td>
<td>8, 195</td>
<td></td>
</tr>
<tr>
<td>Statistics</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>Strong Auditorium</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Student Activities</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Student Affairs</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Student Government</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Student Retention</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>Student Status, Determination of</td>
<td>180</td>
<td></td>
</tr>
<tr>
<td>Students, Dean of</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Studio Arts</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Study Abroad</td>
<td>26</td>
<td></td>
</tr>
<tr>
<td>Study Skills</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>Summer School Courses</td>
<td>177</td>
<td></td>
</tr>
<tr>
<td>Summer Study</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>T</td>
<td>&quot;Take Five&quot; Program</td>
<td>23</td>
</tr>
<tr>
<td>Teaching, Fifth Year</td>
<td>171</td>
<td></td>
</tr>
<tr>
<td>Telecommunications Service</td>
<td>193</td>
<td></td>
</tr>
<tr>
<td>Testing Office</td>
<td>185</td>
<td></td>
</tr>
<tr>
<td>Theater, Minor in</td>
<td>67</td>
<td></td>
</tr>
<tr>
<td>3-2 Programs</td>
<td>35, 23</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Business Administration</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>Computer Science</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>142</td>
</tr>
<tr>
<td></td>
<td>Engineering and Applied Science</td>
<td>337</td>
</tr>
<tr>
<td></td>
<td>Human Development</td>
<td>171</td>
</tr>
<tr>
<td></td>
<td>Medical Statistics</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>Nursing</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>Optics</td>
<td>152</td>
</tr>
<tr>
<td></td>
<td>Public Health</td>
<td>122</td>
</tr>
<tr>
<td></td>
<td>Public Policy Analysis</td>
<td>124</td>
</tr>
<tr>
<td></td>
<td>Todd Theater</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Transcripts</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>Freshman Policy</td>
<td>180</td>
</tr>
<tr>
<td></td>
<td>Transfer Admission</td>
<td>199</td>
</tr>
<tr>
<td></td>
<td>Transferring Within the University</td>
<td>181</td>
</tr>
<tr>
<td></td>
<td>Travel Information</td>
<td>197</td>
</tr>
<tr>
<td></td>
<td>Trustees, University</td>
<td>209</td>
</tr>
<tr>
<td></td>
<td>Tuition</td>
<td>203</td>
</tr>
<tr>
<td></td>
<td>Tutoring Program</td>
<td>175</td>
</tr>
<tr>
<td></td>
<td>Two-Degree Program (Engineering and Applied Science)</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>Undergraduate Research</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>University and Community Affairs, Office of</td>
<td>192</td>
</tr>
<tr>
<td></td>
<td>University Athletic Association</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>University Buildings</td>
<td>211</td>
</tr>
<tr>
<td></td>
<td>University College of Liberal and Applied Studies</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>University Day</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>University Health Service (UHS)</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>University-Wide Studies</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Ventures, Freshman</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Visits to the University</td>
<td>197</td>
</tr>
<tr>
<td></td>
<td>Visual Science</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td>Margaret Warner Graduate School of Education and Human Development, see Education and Human Development</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Washington Semester Program</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Welles-Brown Room</td>
<td>18</td>
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<tr>
<td></td>
<td>William E. Simon Graduate School of Business Administration, see Business Administration</td>
<td></td>
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<tr>
<td></td>
<td>Wilson Commons</td>
<td>187</td>
</tr>
<tr>
<td></td>
<td>Withdrawal and Inactive Status</td>
<td>179</td>
</tr>
<tr>
<td></td>
<td>Women's Studies</td>
<td>133</td>
</tr>
<tr>
<td></td>
<td>Work and Career Development, Center for</td>
<td>183</td>
</tr>
<tr>
<td></td>
<td>Work Study (Part-Time Employment)</td>
<td>205</td>
</tr>
<tr>
<td></td>
<td>Writing, Minor in</td>
<td>67</td>
</tr>
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## ABBREVIATIONS

<table>
<thead>
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<td>Religious and Classical Studies</td>
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<td>Romanian</td>
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<tr>
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<td>Women's Studies</td>
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</tbody>
</table>
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Director of Admissions
University of Rochester
Rochester, New York 14627-0251
(716) 275-3221

Director of Admissions
Eastman School of Music
26 Gibbs Street
Rochester, New York 14604
(716) 275-3003

Office of Admissions
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Box 601
Rochester, New York 14642-8601
(716) 275-4539

Assistant Dean for M.B.A. Programs,
William E. Simon Graduate School of Business Administration
305 Schlegel Hall
University of Rochester
Rochester, New York 14627-0107
(716) 275-3533

Dean, Margaret Warner Graduate School of Education and Human Development
304 Lattimore Hall
University of Rochester
Rochester, New York 14627-0425
(716) 275-5950

The Secretary of Graduate Admissions
Office of Admissions
University of Rochester
Rochester, New York 14627-0251
(716) 275-3221

Assistant Dean, Office of Special Programs
127 Lattimore Hall
University of Rochester
Rochester, New York 14627-0358
(716) 275-2344