The information in this bulletin was prepared in the spring of 2011. 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.

Current information is available from the Office of the Registrar, P.O. Box 270038, University of Rochester, Rochester, New York 14627-0038. Phone: (585) 275-5131.

The University of Rochester values diversity and is committed to equal opportunity for persons regardless of age, color, disability, ethnicity, gender identity or expression, genetic information, marital status, military/veteran status, national origin, race, religion/creed, sex, sexual orientation or any other status protected by law. Further, the University complies with all applicable non-discrimination laws in the administration of its policies, admissions, employment, and access to and treatment in University programs and activities. Questions on compliance with the Equal Opportunity Statement should be directed to the particular school or department and/or to the University’s Equal Opportunity Coordinator, Kathleen Sweetland, University of Rochester, P.O. Box 270039, Rochester, NY 14627-0039. Phone: (585) 275-9125.

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.
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The University

Arts, Sciences, and Engineering

The College
The College is the undergraduate division of Arts, Sciences, and Engineering. The majority of University undergraduate students are enrolled in the College, which is the oldest of the University’s academic units. It remains the “home” college for most undergraduates during their studies at Rochester.

School of Arts and Sciences
The School of Arts and Sciences provides undergraduate and graduate degree programs in the humanities, natural and physical sciences, and social sciences. The juxtaposition of these fields enables undergraduate students in the College to draw upon a rich array of learning opportunities, and through the Rochester Curriculum, to engage deeply with areas of interest that may be outside of their intended majors. A number of programs and degree options specifically enable multidisciplinary work: among these are four public health–related majors: African and African-American studies; those that combine interests in music with cognition, linguistics, or engineering and physics; and individualized majors and minors. Certificate programs such as literary translation studies and actuarial studies also have a multidisciplinary approach.

Edmund A. Hajim School of Engineering and Applied Sciences
The Edmund A. Hajim School of Engineering and Applied Sciences enrolls first-year students who express an interest in concentrating in one of the engineering and applied science disciplines. Students may also move into a Hajim School program at any time after their first semester provided they have the appropriate science and mathematics background and have, or can schedule, the necessary prerequisites for their intended majors. The school’s Bachelor of Science programs in biomedical, chemical, electrical and computer, and mechanical engineering are accredited by the Accreditation Board for Engineering and Technology, the national accreditation agency for the engineering profession. The Institute of Optics and the Department of Computer Science, which also offer Bachelor of Science degrees, are internationally known centers for teaching and research. In addition, there are provisions for student-designed programs that can lead to either a Bachelor of Science degree in interdisciplinary engineering or a Bachelor of Arts degree in engineering science.

Other Schools of the University

Eastman School of Music
Known throughout the world as a major center for the education of professional musicians as well as for the study and creation of music, the Eastman School of Music offers diverse curricula leading to undergraduate and graduate degrees. Students pursuing a Bachelor of Arts degree with a major in music through the College 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. Some students apply and are admitted both to the College and the Eastman School, and pursue a dual degree program.

School of Medicine and Dentistry
In addition to the programs leading to the MD, MS, MPH, and PhD degrees, the School of Medicine and Dentistry offers unusual opportunities for undergraduates. In the Rochester Early Medical Scholars Program (REMS), a BA/BS-MD program, exceptionally talented students enter the University with a conditional acceptance to the medical school.

School of Nursing
The School of Nursing offers study leading to the Bachelor of Science degree with a major in nursing. Admission to the School of Nursing requires either a registered nurse license or a prior baccalaureate degree in a non-nursing field. The curriculum is designed to be responsive to adult learners, and this has become the focus of the baccalaureate nursing program. The degree programs offered by the school include a Bachelor of Science,
an RN to BS or RN to BS to MS program for registered nurses, Master of Science nurse practitioner specialties, MS in leadership in health care systems, MS and PhD dual-degree programs, Doctor of Nursing Practice, and the Doctor of Philosophy in Health Practice Research. Post-master’s programs are also available.

William E. Simon Graduate School of Business Administration

The Simon Graduate School of Business 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 (MBA) in five years instead of the usual six. This 3-2 program consists of three years of undergraduate study in the 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.

Margaret Warner Graduate School of Education and Human Development

The Warner Graduate School of Education provides a broad range of courses of general interest to educators and those interested in the many issues related to education, socialization, learning, aging, leadership, and growth. The Warner School offers master’s and doctoral degree programs in teaching and curriculum, school leadership, higher education, educational policy, counseling, human development, and health professions education. Undergraduates can take courses in subjects ranging from the history of American education to child development and learning. In most cases, the basic teacher preparation program (leading to NYS Initial Teaching Certification and fulfilling all the academic requirements for Professional Teaching Certification) is offered through 15 months of postgraduate study and is offered at the early childhood and elementary levels and in mathematics, English, Latin, French, Spanish, German, biology, chemistry, physics, earth science, and social studies at the secondary level. Programs for those interested in Teaching English to Speakers of Other Languages (grades K–12), Teaching Students with Disabilities, and Teaching Literacy (at either birth to grade 6 or grades 5–12) are also available.

The Warner School also offers combined undergraduate and graduate programs in counseling and human development, designed for qualified University of Rochester undergraduate students planning either to become school counselors or mental health counselors, or to continue with graduate study in human development. Students begin graduate study toward the Master of Science (MS) degree during their senior year. The master’s program in human development can be completed after one year of postgraduate study. The school counseling program, which leads to New York State certification as a school counselor, takes about two years of postgraduate study. The program in community mental health counseling that leads to New York State licensure in mental health counseling also can be completed in about two additional years.

The Warner School offers the Guaranteed Rochester Accelerated Degree in Education (GRADE) program, which is a five-year BA/BS + MS education program for students admitted to the University of Rochester who are interested in becoming educators. GRADE students enter the University of Rochester with an assurance of admission to the Warner School with the Steven Harrison quarter-tuition scholarship for the duration of the program (this offer is contingent on students meeting prerequisites for their selected area of specialization by the time they complete their undergraduate program). The program is designed to offer students a quality liberal arts education while also preparing them to become educators.

University Campuses

River Campus is the University’s main campus and the residential setting for the College undergraduates. It is also the location of 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 1,140-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 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 (including Golisano Children’s Hospital), with a capacity of 740 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 Medical Center also includes the Eastman Institute for Oral Health and the James P. Wilmot Cancer Center, and is affiliated with nearby Highland Hospital.

The Eastman School of Music campus is located in downtown Rochester and linked to the other campuses by free shuttle buses. Opened in 1921 as the University’s first professional school, Eastman presents more than 700 concerts a year, many of them free. Its primary concert venues include Kodak Hall at Eastman Theatre, the performance home for Eastman’s large ensembles as well as the Rochester Philharmonic Orchestra; Kilbourn Hall, Howard Hanson Recital Hall, and Kilian and Caroline Schmitt Organ Recital Hall in the school’s main building; and Hatch Recital Hall in the newest addition to the Eastman Campus, the Eastman East Wing. The School’s Sibley Music Library, housed in the Miller Center, has holdings of nearly three-quarters of a million items and is recognized as one of the foremost music research libraries in the world.

The University’s South Campus is located to the southwest of the River Campus and the Medical Center. It comprises University Park, Whipple Park, and River Road residence complexes; the Laboratory for Laser Energetics; the Center for Optoelectronics and Imaging; the Robert L. Sproull Center for Ultra High Intensity Laser Research; the Alumni and A dministrative Annex.
With its permanent collection spanning 50 centuries of world art, the University’s Memorial Art Gallery is considered one of the finest regional art museums in the country. Among its treasures are works by such artists as Monet, Cézanne, Matisse, Homer, and Cassatt. The Gallery offers a year-round schedule of exhibitions and tours and events as well as a restaurant and gift shop. A free shuttle bus to other campuses stops one block away. C. E. K. Mees Observatory is located on Gannett Hill in the Bristol Hills south of Rochester.

Libraries
The University library system houses more than 3.5 million volumes and has extensive collections of online databases, electronic journals, rare books, and musical scores.

- Rush Rhees (humanities, social sciences, and business)
- Carlson Library (sciences and engineering)
- Physics-Optics-Astronomy Library
- Computer Science
- Physics and Physics and Astronomy
- Engineering and Applied Sciences
- Business Administration
- Charlotte Whitney Allen Library (Memorial Art Gallery), and the library at the Laboratory for Laser Energetics.

Beyond River Campus are Edward G. Miner Library (Medical Center), Sibley Music Library (Eastman School of Music), Charlotte Whitney Allen Library (Memorial Art Gallery), and the library at the Laboratory for Laser Energetics.

Students taking their entire four years as undergraduates in the College 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. 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. 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.

Special Academic Opportunities

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
- Computer Science
- Engineering and Applied Sciences
- Neuroscience
- Physics and Physics and Astronomy
- Public Health

Certificate Programs
Some students combine their departmental majors with an interdisciplinary specialization by following one of the Certificate Programs—in actuarial studies, Asian studies, literary translation studies, mathematical modeling in political science and economics, and Polish and Central European studies—offered through the Multidisciplinary Studies Center. The Undergraduate Program in Physics and Astronomy offers a Certificate in Biological or Medical Physics. In addition, a Certificate in Biotechnology is offered through the Undergraduate Program in Biology and Medicine. The Department of English offers a certificate in Stage Management. These certificates, which give formal recognition to the specialized study, are awarded in addition to the bachelor’s degree. A Citation for Achievement in College Leadership is also available to students who have developed their leadership skills in the ways outlined by this program through the College Center for Academic Support.

Honor Societies
National academic honorary societies include Phi Beta Kappa, Golden Key, Tau Beta Pi (engineering), National Society of Collegiate Scholars (scholarship, leadership, and service), Beta Gamma Sigma (business, graduate students only), Sigma Theta Tau (nursing), Alpha Omega Alpha (medicine), and Sigma Pi Sigma (physics and astronomy).

Independent Study
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 full-time members of the teaching faculty, with the content and objectives of the course determined by faculty-student collaboration. Internships and supervised teaching opportunities are also available to qualified students through the independent study program.

Practicum are credit courses supervised by University faculty members that 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.

Interdepartmental Degree Programs
The interdepartmental degree programs provide students with an unusual opportunity to construct individual programs suited to their special talents and interests. Students are currently pursuing interdepartmental majors in culture and communications, computers in media, American studies, and Latin-American studies, among others. Faculty members related to the College Center for Study Abroad and Interdepartmental Programs assist undergraduates in developing their interdepartmental studies majors in the School of Arts and Sciences. Students planning an interdepartmental program leading to a Bachelor of Science in engineering and applied science or the Bachelor of Arts in engineering science work closely with faculty members on the Interdepartmental Engineering Committee in the Edmund A. Hajim School of Engineering and Applied Sciences.

Interdisciplinary Studies
The Center for Study Abroad and Interdepartmental Programs enables students to pursue educational goals that lie outside traditional disciplines and departments. Through its faculty Committee on Individualized Interdepartmental Programs, it
supervises specially constructed programs leading to the BA degree. These include programs tailored to the specific needs of the individual student. In recent years these individualized majors have included such diverse areas as Italian studies, law and society, and sustainability.

**Internships**

Internships enable students to work in a variety of off-campus settings. Students in arts and sciences, under the supervision of a faculty member, can receive credit for their work. Recent internship placements have included the Rochester District Attorney’s office, the Democrat and Chronicle newspaper, local television stations, environmental field work for the county, the Memorial Art Gallery, George Eastman House, and various financial and investment offices. In social services internships, students have worked in various programs that help emotionally and physically abused children and the developmentally disabled. With special approval, students may engage in full-time internships away from the Rochester area; examples include research projects at the Federal Reserve and at Cohokia Mounds Historical Site. Opportunities for internships in Washington and abroad are described in the sections that follow.

The Washington Semester Program, administered by the Department of Political Science, allows selected students to participate directly in the work of legislators at the national level. Students work full time 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.

**Kauffman Entrepreneurial Year (KEY) Program**

Entrepreneurship education is an integral ingredient of academic activity at the University of Rochester. Prominent in this area is the Kauffman Entrepreneurial Year (KEY) Program that provides selected students with the opportunity to devote one or two semesters, tuition free, to the study and practice of entrepreneurship, defined as “transforming an idea into an enterprise that generates value.”

Students may propose to devote as much as an entire academic year to internships, special projects, business plan development, research into various facets of entrepreneurship, additional coursework, or analysis of how culture and public policy influence entrepreneurial activity. Participation is open to all undergraduates at the University.

**Senior Scholars Program**

The Senior Scholars Program permits selected seniors to devote at least half of the 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 students’ 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.

**Summer Study**

Dozens of summer classes are offered from May to August in four- and six-week sessions, providing students an opportunity to catch up, get ahead, or just enjoy the intellectual stimulation. Many students choose to study abroad during this time. For more information or a complete listing of summer courses, visit www.rochester.edu/summer or call (585) 275-2345.

**Study Abroad**

Study Abroad programs provide qualified students a summer, a semester, or a year of overseas study experience. Currently, more than 70 different Rochester-sponsored opportunities are available in more than 30 countries. Students are also welcome to take part in programs offered by other American colleges and universities. Options include “on-location” courses taught by Rochester faculty overseas, university exchanges, internships, and traditional study abroad programs. For more information, contact the Center for Study Abroad in 206 Lattimore Hall.

**On-location programs** are in Italy, France, Germany, Poland, Russia, Spain, and England:

- Rochester in Arezzo, Italy—a fall-semester program in Italian language, literature, art, and culture. Sponsored by the Department of Modern Languages and Cultures. Open to sophomores, juniors, and seniors.
- London Theater Seminar—a “winter term” course offered in London and Stratford in late December to early January. Sponsored by the Department of English.
- Month-long summer language courses include Italian in Padua; German in Berlin; French in Rennes (Rochester’s sister city in Brittany); Russian in St. Petersburg; and Spanish in Granada, Spain. Sponsored by the Department of Modern Languages and Cultures.
- Other summer options include French sign language and culture, an archaeological dig in Italy and a Malawi immersion program.

**Exchange programs** permit Rochester students to “trade places” with their counterparts from overseas universities. Current options are in England, Germany, Israel, Japan, and Sweden.

- Sussex University, Sussex, England—a semester or one-year exchange for sophomore or junior brain and cognitive sciences majors. Located in Brighton, one hour south of London.
- University of Cologne, Germany—sponsored by the German section of the Department of Modern Languages and Cultures. A full-year program for juniors or seniors to take courses and to teach English. This unique fellowship program also provides a stipend.
- Braude College, Karmiel, Israel—a spring semester program for junior mechanical engineering majors. Located in the

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**Universities**

- Braude College, Karmiel, Israel—a spring semester program
- Sussex University, Sussex, England—a semester or one-year exchange
- University of Cologne, Germany—sponsored by the German section of the Department of Modern Languages and Cultures
- Braude College, Karmiel, Israel—a spring semester program

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**Contact**

For more information, contact the Center for Study Abroad in 206 Lattimore Hall.
Galilee, in the north of Israel. Sponsored by the Edmund A. Hajim School of Engineering and Applied Sciences.

- Meiji-Gakuin University, Tokyo, Japan—a semester or year-long program in Japanese language and culture.
- Uppsala University, Uppsala, Sweden—a semester or year at one of Europe’s oldest universities, located 45 minutes from Stockholm. English-language courses in the humanities, social sciences, engineering, and natural sciences.

In addition to these exchanges, universities in Egypt, Israel, and Poland accept visiting Rochester students in special English-language programs. The American University in Cairo, Egypt, offers a semester or a full year at this four-year liberal arts college. AUC is noted for its coursework in Arabic language, Islamic art and architecture, Egyptology, and Middle Eastern history, society, and politics. The overseas program at Ben-Gurion University of the Negev in Beersheva, Israel, offers full-year and semester study. The program begins with an intensive Hebrew-language course (Ulpan), and classes taught in English include such unique options as premedical studies, environmental and desert studies, health and social welfare, Israeli studies, and internships. At the Hebrew University of Jerusalem, students attend courses taught in English in history, politics, religion, Judaic studies, economics, and Middle Eastern languages and literatures. Those proficient in Hebrew may enroll in regularly scheduled Hebrew University courses. In Poland, at the Jagiellonian University in Krakow, courses include Polish language, history, Judaic studies, literature, political science, immigration, economics, and sociology. The Jagiellonian University program is sponsored by the University of Rochester’s Skalny Center for Polish and Central European Studies.

**Internship programs** are located in England, Scotland, Belgium, Germany, and Spain and are open to students majoring in a wide variety of fields. Students take coursework paired with a related internship. Semester programs are offered in all locations, and eight-week summer internships are available in all sites except Spain.

- London—The British Politics Internship program places students as interns with Members of the House of Commons or in the Scottish Parliament, pressure groups, party headquarters, or constituency offices, where they carry out research, write speeches and press releases, and experience the workings of the British political system at close hand. Internships in law offices and other private or governmental agencies, and public policy institutes are also offered. Business internships are available in advertising, banking, finance, marketing, and media. Arts placements include institutions such as theaters, museums, galleries, and performing arts centers. Students participate in daily operations, including mounting exhibitions, helping to plan projects, and carrying out research. The Health Science/Medical Research Internship offers students the opportunity to work as interns either in a research laboratory in one of London’s teaching hospitals, in a psychiatric treatment program, or in health care administration in a broad range of facilities.

- In Berlin, politics interns work with Members of the Bundestag and political offices. In Bonn, placements are made in business, law, the arts, museums, and social service agencies. Brussels interns work with Members of the European Parliament. Depending on language proficiency, placements are made with MEPs from any of the European Union member nations. Business placements with multinational corporations are also available. In Madrid, students are placed with political offices, businesses, and museums.

- Rochester belongs to several consortia that provide access to programs through the Institute for the International Education of Students (IES), the Council on International Educational Exchange (CIEE), and Advanced Studies in England (ASE). Through IES, the University of Rochester provides semester and academic year programs in Argentina, Australia, Austria, Chile, China, Ecuador, France, Germany, India, Ireland, Italy, Japan, Morocco, the Netherlands, New Zealand, South Africa, Spain, and the United Kingdom. CIEE semester or year programs are in China, Czech Republic, France, Ghana, Hungary, Italy, Poland, Russia, Senegal, and Thailand. Rochester is also a member of the Advanced Studies in England consortium, a semester or yearlong program focusing on British Studies in Bath, Oxford, and Stratford. The University of Rochester is also affiliated with the Danish Institute for Study Abroad (DIS) in Copenhagen and the College Year in Athens (CYA) program, which offers courses in the social sciences and humanities focusing on ancient and modern Greece.

Study abroad is open to all majors, and new programs are currently under development. The Center for Study Abroad’s advising staff works closely with students to enable them to find the program best suited to their academic interests. General information meetings are held on a regular basis.

**Take Five Scholars**

The Take Five Scholars Program grants selected undergraduates a ninth semester or fifth year of study, tuition free, to supplement their regular course requirements. Students may apply any time after they have been accepted into a major through the first semester of their senior year. The program, in place for over 20 years, is designed for students who can demonstrate that an additional period of study will broaden and enhance their under-graduate education.

**Undergraduate Research**

As a major research institution, the University actively encourages primary research by undergraduates in the natural sciences, engineering, the social sciences, and humanities. 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. For information, visit the Office of Undergraduate Research website at www.rochester.edu/college/ugresearch/.
Degrees Offered

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

**Arts, Sciences, and Engineering**

**School of Arts and Sciences**

For purposes of the Rochester Curriculum, the distribution area is noted in which each degree program and minor in the College falls. H=Humanities, S=Social Sciences, N=Natural Sciences and Engineering, V=Variable (determined at time of official entrance into the program).

African and African-American Studies (BA)-V
American Sign Language (BA)-H
American Studies (BA)-S
Anthropology (BA)-S
Archaeology, Technology, and Historical Structures (BA)-V
Art and Art History:
  - Art History (BA)-H
  - Studio Arts (BA)-H
Bioethics (BA)-H
Biological Sciences (BS), with specialties in:
  - Biochemistry-N
  - Cell and Developmental Biology-N
  - Ecology and Evolutionary Biology-N
  - Microbiology-N
  - Molecular Genetics-N
  - Neuroscience-N
Biology (BA, MS, PhD)-N
Brain and Cognitive Sciences (BA, BS, MA, PhD)-N
Business (BA)-S
Chemistry (BA, BS, MS, PhD)-N
Earth and Environmental Sciences:
  - Environmental Science (BS)-N
  - Environmental Studies (BA)-N
  - Geological Sciences (BA, BS, MS, PhD)-N
  - Geomechanics (BS)-N
Economics (BA, MA, PhD)-S
Economics and Business Strategies (BA)-S
English (BA, MA, PhD)-H
Epidemiology (BA)-S
Film and Media Studies (BA)-H
Financial Economics (BA)-S
Health and Society (BA)-S
Health, Behavior, and Society (BA)-S
Health Policy (BA)-S
History (BA, MA, PhD)-S
Interdepartmental Studies (BA, MA, MS)-V
International Relations (BA)-S
Linguistics (BA, MA)-S
Literary Translation (MA)
Mathematics (BA, BS, MA, PhD)-N
Mathematics-Statistics (BS, MS)-N
Modern Languages and Cultures:
  - Comparative Literature (BA, MA)-H
  - French (BA, MA)-H
  - German (BA, MA)-H
  - Japanese (BA)-H
  - Russian (BA)-H
  - Spanish (BA, MA)-H
Music (BA)-H
Philosophy (BA, MA, PhD)-H
Physics (BA, BS, MA, MS, PhD)-N
Physics and Astronomy (BA, BS, PhD)-N
Political Science (BA, MA, PhD)-S
Psychology (BA, MA)-S
Clinical (PhD)
Developmental (PhD)
Social-Personality (PhD)
Religion and Classics:
  - Classics (BA)-H
  - Religion (BA)-H
Russian Studies (BA)-V
Statistics (BA)-N
Women's Studies (BA)-V
Certificate Programs
(taken in conjunction with a bachelor’s degree)
Actuarial Studies
Asian Studies
Biophysics
Biotecnology
Literary Translation Studies
Mathematical Modeling in Political Science and Economics
Medphysics
Polish and Central European Studies
Stage Management
Citation for Achievement in College Leadership

Minors
African and African-American Studies-V
American Sign Language-H
Anthropology-S
Arabic-H
Archaeology, Technology, and Historical Structures-V
Art History-H
Astronomy-N
Bioethics-H
Biology-N
Brain and Cognitive Sciences-N
Business-S
Chemistry-N
Chinese-H
Classics-H
Clinical Psychology-S
Comparative Literature-H
Dance-H
Economics-S
Economics and Business Strategies-S
English Literature-H
Environmental Geology-N
Epidemiology-S
Ethics-H
Film and Media Studies-H
French-H
Gender Psychology-S
Geological Sciences-N
German-H
Greek-H
Health and Society-S
Health, Behavior, and Society-S
Health Policy-S
Health Psychology-S
History-S
History of Philosophy-H
Interdepartmental Studies-V
International Relations-S
Italian-H
Japanese-H
Jewish Studies-H
Latin-H
Latin American Studies-H
Legal Studies-V
Linguistics-S
Mathematics-N
Medical Anthropology-S
Movement Studies-H
Music-H
Music Cognition-N
Music and Linguistics-S
Organizational Psychology-S
Paleontolgy and Evolution-N
Philosophy-H
Philosophy of Science-H
Physics-N
Political Science-S
Psychology-S
Psychology as a Natural Science-N
Psychology as a Social Science-S
Religion-H
Research in Visual Science-N
Russian-H
Russian Studies-V
Social and Emotional Development-S
Spanish-H
Statistics-N
Studio Arts-H
Theater-H
Visual Science-N
Women’s Studies-V
Writing-H

Edmund A. Hajim School of Engineering and Applied Sciences
For purposes of the Rochester Curriculum, the distribution area is noted in which each degree program and minor in the College falls. H=Humanities, S=Social Sciences, N=Natural Sciences and Engineering, V=Variable (determined at time of official entrance into the program).
Biomedical Engineering (BS, MS, PhD)-N
Chemical Engineering (BS, MS, PhD)-N
Computer Science (BA, BS, MS, PhD)-N
Electrical and Computer Engineering (BS)-N
Electrical Engineering (MS, PhD)
Engineering and Applied Science (an Interdepartmental Program) (BS)-N
Engineering Science (an Interdepartmental Program) (BA)-N
Geomechanics (BS)-N
Materials Science (MS, PhD)
Mechanical Engineering (BS, MS, PhD)-N
Optics (BS, MS, PhD)-N
Optical Engineering (BS)-N
Technical Entrepreneurship and Management (joint program with the Simon School) (MS)
Minors
Bioenvironmental Engineering-N
Biomedical Engineering-N
Chemical Engineering-N
Computer Science-N
Electrical and Computer Engineering-N
Environmental Engineering-N
Materials Science-N
Mechanical Engineering-N
Optics-N

Eastman School of Music
Applied Music (BM)
Composition (BM, MA, MM, DMA, PhD)
Conducting (MM, DMA)
Early Music, Emphasis in Historical Plucked Instruments (MM, DMA)
Ethnomusicology (MA)
Jazz Studies and Contemporary Media (BM, MM, DMA)
Musical Arts (BM)
Music Education (BM, MA, MM, DMA, PhD)
Music Theory (BM, MA, PhD)
Musicology (MA, PhD)
Opera (MM)
Pedagogy of Music Theory (MA)
Performance and Literature (MM, DMA)
Piano Accompanying and Chamber Music (MM, DMA)

School of Medicine and Dentistry
Biochemistry (MS, PhD)
Biophysics (MS, PhD)
Clinical Investigation (MS)
Dental Science (MS)
Epidemiology (PhD)
Genetics (MS, PhD)
Health Services Research and Policy (PhD)
Marriage and Family Therapy (MS)
Medical Informatics (MS)
Medical Statistics (MS)
Medicine (MD, MD/MBA)
Microbiology (MS)
Microbiology and Immunology (PhD)
Neurobiology and Anatomy (MS, PhD)
Neuroscience (MS, PhD)
Pathology (MS, PhD)
Pharmacology (MS, PhD)
Physiology (MS, PhD)
Public Health (MPH)
Statistics (MA, PhD)
Toxicology (MS, PhD)
Translational Research (MS)
Translational Biomedical Science (PhD)

School of Nursing
Bachelor Programs:
  Nursing—RN to BS
Accelerated Program for Non-Nurses
Nursing (BS)/MS Accelerated Programs for Non-Nurses:
  Nursing/Adult Nurse Practitioner
  Nursing/Emergency Nurse Practitioner
School of Nursing:
  Nursing/Care of Children and Families—PEDIATRIC NURSE PRACTITIONER
Nursing/CARE OF CHILDREN AND FAMILIES—NEONATAL NURSE PRACTITIONER
Nursing/FAMILY NURSE PRACTITIONER
Nursing/Psychiatric/Mental Health Nurse Practitioner
  (Adult Family)
RN to BS to MS Programs:
  Nursing/Adult Nurse Practitioner
  Nursing/Emergency Nurse Practitioner
Nursing/CARE OF CHILDREN AND FAMILIES—NEONATAL NURSE PRACTITIONER
Nursing/Care of Children and Families—PEDIATRIC NURSE PRACTITIONER
Nursing/CARE OF CHILDREN AND FAMILIES—NEONATAL NURSE PRACTITIONER
Nursing/Psychiatric/Mental Health Nurse Practitioner
  (Adult Family)
MS Programs:
  Acute Care Nurse Practitioner
  Adult Nurse Practitioner
  Care of Children and Families—PEDIATRIC NURSE PRACTITIONER
  Care of Children and Families—NEONATAL NURSE PRACTITIONER
MS/PhD Programs:
  Acute Care Nurse Practitioner/NURSING
  Adult Nurse Practitioner/NURSING
  Care of Children and Families—PEDIATRIC NURSE PRACTITIONER/NURSING
  Care of Children and Families—PEDIATRIC NURSE PRACTITIONER/NURSING
DNP Program
PhD Program:
  Health Practice Research
**William E. Simon Graduate School of Business Administration**

Business Administration (MS, MBA, PhD, MBA/MPH, MD/MBA, MS in Accountancy, and graduate-level certificate programs)

**Margaret Warner Graduate School of Education and Human Development**

The list of Warner programs/degrees is presented to give a clear sense of program focus. Technically, some of the programs award degrees in education with a concentration in the specialty areas listed below.

**Counseling:**
- School Counseling (MS)
- Mental Health Counseling (MS, EdD)
- Counseling and Counselor Education (EdD, PhD)
- Educational Policy (MS, PhD)
- Health Professions Education (MS)
- Higher Education (MS, EdD, PhD)
- Human Development (MS, EdD, PhD)
- School Leadership (MS, EdD)

**Teaching and Curriculum:**
- Early Childhood Education (MS)
- Childhood Education (MS)
- Adolescence Education (English, mathematics, science, social studies, foreign languages, or Latin) (MS, MAT)
- Inclusive/Special Education (as an additional certification with programs listed above)
- TESOL (Teaching English to Speakers of Other Languages) (MS)
- Teaching Literacy (MS)
- Teaching and Curriculum (MS, EdD, PhD)

**University-Wide Studies**

**Combined Bachelor’s Programs:**
- BA and BS in arts and sciences
- BA or BS in arts and sciences and BS or BA in engineering and applied sciences
- BA or BS in arts and sciences and BM in music
- BS in engineering and applied sciences and BM in music

**3-2 Programs:**
- BA and BS in an engineering concentration (for transfer students)
- BA or BS plus an MBA
- BA or BS plus a master’s in public health
- BS and MS in biological sciences—neuroscience
- BS and MS in biomedical engineering
- BS and MS in chemical engineering
- BS and MS in electrical and computer engineering
- BS and MS in mechanical engineering
- BS and MS in optics

**Combined Bachelor’s and MD Degree Program:**
- BA or BS plus an MD

**Concurrent Master’s Programs:**
- MBA and MS in microbiology

**Inter-College Degree Programs:**
- Genetics (PhD)
- Neuroscience (MS, PhD)
Academic Calendar

Arts, Sciences, and Engineering*

2011 Fall Semester
August 31 (Wednesday)
Classes begin at the College.

September 5 (Monday)
Labor Day. No classes.

September 20 (Tuesday)
Last date for students in the College to add 4-credit independent study courses.

September 27 (Tuesday)
Last date for students in the College to have courses deleted from current program.
Last date for students in the College to add courses.

October 10–11
Fall term break begins at close of classes for the College.

October 12 (Wednesday)
Classes resume.

October 20 (Thursday)
Registration materials distributed to undergraduates in the College.

October 24–November 4
Undergraduate program advising in the College.

November 7 (Monday)
Undergraduate registration begins.

November 15 (Tuesday)
Last day to declare S/F or withdraw from courses for undergraduates in Arts, Sciences, and Engineering.

November 23 (Wednesday)
Thanksgiving recess begins at noon.

November 28 (Monday)
Classes resume.

November 29 (Tuesday)
Last date for first-semester freshmen and transfer students in the College to declare the S/F option.

December 13 (Tuesday)
Classes end.

December 14 (Wednesday)
Reading period begins at close of classes (optional by college or school offering course).

December 16 (Friday)
Reading period ends.

December 17–22
Final examinations.

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

2012 Spring Semester
January 16 (Monday)
Martin Luther King Day (observed).

January 18 (Wednesday)
Classes begin at the College.

February 7 (Tuesday)
Last date for students in the College to add 4-credit independent study courses.

February 14 (Tuesday)
Last date for students in the College to have courses deleted from current program.
Last date for students in the College to add courses.

March 10 (Saturday)
Spring recess begins.

March 19 (Monday)
Classes resume.

* Eastman School of Music and School of Nursing Calendars differ slightly.
March 22 (Thursday)
Registration materials distributed to undergraduates in Arts, Sciences, and Engineering.

March 26–April 6
Undergraduate program advising in the College.

April 9 (Monday)
Undergraduate registration begins.

April 10 (Tuesday)
Last day to declare S/F or withdraw from courses for undergraduates in Arts, Sciences, and Engineering.

April 24 (Tuesday)
Last date for first-semester freshmen and transfer students in the College to declare the S/F option.

May 2 (Wednesday)
Classes end.

May 3 (Thursday)
Reading period begins at close of classes (optional by college or school offering course).

May 6 (Sunday)
Reading period ends.

May 7–14
Final examinations.

May 18–20
Commencement Weekend.

2012 Summer
May 21–August 10
Full summer session (12 weeks).

May 21–June 18
First four-week session.

May 21–June 29
First six-week session.

May 28 (Monday)
Memorial Day observed. No classes.

July 2–30
Second four-week session.

July 4 (Wednesday)
Independence Day observed. No classes.

July 2–August 10
Second six-week session.

2012 Fall Semester
August 30 (Thursday)
Classes begin.

September 3 (Monday)
Labor Day. No classes.

September 19 (Wednesday)
Last date for students in the College to add 4-credit independent study courses.

September 26 (Wednesday)
Last date for students in the College to have courses deleted from current program.

October 8–9
Fall term break begins at close of classes for the College.

October 10 (Wednesday)
Classes resume.

October 18 (Thursday)
Registration materials distributed to undergraduates in the College.

October 22–November 2
Undergraduate program advising in the College.

November 5 (Monday)
Undergraduate registration begins.

November 14 (Wednesday)
Last day to declare S/F or withdraw from courses for undergraduates in Arts, Sciences, and Engineering.

November 21 (Wednesday)
Thanksgiving recess begins at noon.

November 26 (Monday)
Classes resume.

November 28 (Wednesday)
Last date for first-semester freshmen and transfer students in the College to declare the S/F option.

December 12 (Wednesday)
Classes end.

December 13 (Thursday)
Reading period begins at close of classes (optional by college or school offering course).

December 15 (Saturday)
Reading period ends.

December 16–22
Final examinations.

December 22 (Saturday)
Winter recess begins at end of examinations.
2013 Spring Semester

January 16 (Wednesday)
Classes begin at the College.

January 21 (Monday)
Martin Luther King Day (observed). No classes.

February 5 (Tuesday)
Last date for students in the College to add 4-credit independent study courses.

February 12 (Tuesday)
Last date for students in the College to have courses deleted from current program.
Last date for students in the College to add courses.

March 9 (Saturday)
Spring recess begins.

March 18 (Monday)
Classes resume.

March 21 (Thursday)
Registration materials distributed to undergraduates in the College.

March 25–April 5
Undergraduate program advising in the College.

April 8 (Monday)
Undergraduate registration begins.

April 9 (Tuesday)
Last day to declare S/F or withdraw from courses for undergraduates in Arts, Sciences, and Engineering.

April 23 (Tuesday)
Last date for first-semester freshmen and transfer students in the College to declare the S/F option.

May 1 (Wednesday)
Classes end.

May 2 (Thursday)
Reading period begins at close of classes (optional by college or school offering course).

May 5 (Sunday)
Reading period ends.

May 6–13
Final examinations.

May 17–19
Commencement Weekend.

2013 Summer

May 20–August 9
Full summer session (12 weeks).

May 20–June 17
First four-week session.

May 20–June 28
First six-week session.

May 27 (Monday)
Memorial Day observed. No classes.

July 1–29
Second four-week session.

July 4 (Thursday)
Independence Day observed. No classes.

July 1–August 9
Second six-week session.
The Rochester Curriculum

In the American system of education, college is the time in which students’ intellectual growth and personal growth coincide—as they gain the ability to make a series of critical choices. Most of education through the 12th grade and most of graduate and professional training is mandated by someone else—a school board, an accrediting agency, the demands of a profession or a career. In America, it is uniquely in the college years that students choose their subjects and thereby sharpen their interests, develop their skills, and focus their goals. Through the freedom of the so-called modular system of education that marks American undergraduate learning, students grow as thinkers and as persons.

The Rochester Curriculum takes the special character of college education seriously and attempts to craft a structure of learning that both respects the students as individual learners and takes full advantage of Rochester’s character as a research university. University researcher/teachers are self-motivated learners, people who every day work to sharpen understanding and create new knowledge. More than any other group in society, a university research faculty knows how to make learning the habit of a lifetime. The basic aim of the Rochester Curriculum is to break down the barriers between the way the faculty learn and the students learn so that students can make not just the content, but also the practice, of disciplined learning their own. The Rochester Curriculum is distinctive among American universities.

Students at Rochester are encouraged to explore a variety of disciplines during their freshman year. As students progress at Rochester, they choose a major, with at least 10 semester courses, in either the humanities, social sciences, or natural sciences (including
mathematics and engineering). In addition, students choose a cluster of three related courses in each of the other two main divisions of the liberal arts named above. Students with a major in an accredited program in engineering or in optics only need to select one cluster.

More than 250 authorized clusters exist from which students may choose. Virtually every department and program in the College offers numerous clusters that meet the spirit of the Rochester Curriculum. Complete descriptions can be found on the web at www.rochester.edu/college/CCAS/clusters/.

Examples from the humanities include Modern and Contemporary Literature, Japanese Language, Ethics and Values. From the social sciences division, examples include Applied Economics, African-American Politics, Psychology of Motivation. In the natural sciences division, examples include Mind and Brain, Foundations of Computer Science, The Nature of the Universe.

The opportunity exists for students to propose exceptions to already existing clusters, and—with the support of two faculty sponsors—students may also propose individualized interdepartmental divisional clusters. Final approval rests with the Curriculum Committee.

The Rochester Curriculum is simple, flexible, and reflects the true hallmarks of university life and learning—curiosity, competence, and community.

Curiosity—The most important discoveries in the history of science, the most enduring works of art and literature, and the most compelling theories of society are the consequences of curiosity—which brings with it scholarly or artistic energy and persistence that won’t let a question rest until it is answered. The freedom to follow one’s own curiosity is the prime motivator of faculty learning, and it works just as well for undergraduates as it does for faculty. Therefore, there is no restriction on the students’ freedom with a system in which they must take required courses to “get them out of the way.” Instead, students take responsibility and build their college education out of their own interests, goals, and aspirations. Broad and free experimentation with ideas and subjects allows them to discover and sharpen their own interests and to learn their own strengths and weaknesses.

Competence—For students to understand how a field of learning actually works, they need to spend sufficient time in it to learn its language, become familiar with its artifacts, and experience its logic. The Rochester Curriculum allows them to do so—not just in their major, but also in two other fields across the liberal arts disciplines. A key mark of a Rochester education is a demonstrable competence in the three major realms of thought and analysis and the consequent ability to make informed intellectual connections across fields and disciplines.

Community—Curiosity does not thrive in isolation, and Rochester’s researchers do not—indeed, cannot—work alone. Active participation in a community of inquiry and expertise, engagement in a heritage of curiosity, is a fundamental ingredient of the intellectual life in a research culture. By providing the framework for a major and two clusters, the Rochester Curriculum invites students into three different intellectual communities—three different sustained conversations about learning and ideas—during their undergraduate careers.

Requirements for the Degrees of 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 BA and BS degrees.

1st Requirement

Completion of Eight Semesters of Approved Coursework

Students are required to complete 32 4-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 3 courses from naval science, and no more than 8 credit hours of dance technique may be counted toward the degree. For students not majoring in music, no more than 16 credit hours of applied music instruction and 8 credit hours of River Campus ensemble may be counted toward the degree.

2nd Requirement

Completion of the Primary Writing Requirement

Entering students fulfill the Primary Writing Requirement by earning a “C” or better in WRT 105, Reasoning and Writing in the College, or WRT 105E, an extended version of 105 developed for students whose placement results suggest that they need a more supportive first-year writing experience. WRT 105 and 105E introduce students to academic writing at the college level and provide instruction and practice in writing clear and cogent argumentative essays. Individual sections of 105 and 105E have unique discipline-specific content and themes designed by each instructor. For section titles and descriptions, please visit writing.rochester.edu/courses/. We encourage students to choose sections that interest them, whether this interest grows out of a desire to learn more about a favorite subject or to try something new.

Incoming freshmen who believe they are proficient college writers may petition to use a course other than WRT 105 or 105E to satisfy the Primary Writing Requirement. The course must involve a significant writing component, usually including several papers across the semester and a substantial research paper. The course used to satisfy the Primary Writing Requirement must be approved by the Writing Program (we recommend preapproval) and may not also be used to satisfy the Upper-Level Writing Requirement. Students must earn a “B” in the alternate course in order to satisfy the Primary Writing Requirement.

3rd Requirement

Completion of the Rochester Curriculum

Satisfactory completion of a major with an average grade of “C” or better. Each major contains an upper-level writing requirement which explicitly incorporates student writing into its curriculum and/or requirements. Students are expected to file their major program after getting it approved by the appropriate faculty advisor in the department or program by the time noted below. The divisional classification of all interdepartmental
majors, as noted in the following paragraph, is determined by the students and the faculty committee responsible for the major.

Satisfactory completion, with an average grade of "C" or better, of an approved divisional cluster composed of at least three courses in each of the two divisions outside the area of the major. Each set of courses for the divisional clusters will be in one of the three divisions: humanities; social sciences; or natural sciences, mathematics, and engineering. Students may also construct a program from existing majors and minors, as long as the principle of distribution over the three divisions is maintained. Students who complete an optics major or engineering major that is professionally accredited need to complete only one divisional cluster outside the area of the major.

Students formally declare their Rochester Curriculum, i.e., their major and two divisional clusters, not later than the beginning of their junior year (by the time 64 credit hours have been taken). Students may alter their program until the final semester of the senior year. The College transcript will reflect the students’ three areas of focus.

Departments of the College discourage students from registering for the next course in a continuing science sequence if an appropriate grade level ("C−" or above) has not been achieved in the preceding course. It has been shown that students’ success in such a sequence is directly related to performance in the preceding course. Students so advised are asked to seek assistance in their future program planning from the College Center for Academic Support and from their pre-major advisors.

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## College Writing Program

### Information about the Program

Faculty across the College agree that mastery of the skills of written argument, including critical thinking, problem solving, organization of ideas, and clarity and power of expression, is of enormous importance both in academic work during residence in the College and in the world of work beyond the College. Writing as part of college life is a given, whether by students completing required coursework, by scholars as part of their professional lives, or by those who find in writing a source of discovery and pleasure. Writing is how we know what it is that we know, because our ability to explain a subject clearly and precisely is an ultimate test of having learned it. To help students join Rochester’s community of writers and researchers, the Writing Program offers writing courses and writing support services, as well as opportunities to celebrate outstanding writers and their work.

The College Writing Program is home to the Primary Writing Requirement, the College’s first step in drawing students into our community of researchers and writers, the Undergraduate Program for Speakers of Other Languages, and the College Writing Center, where students can find tutoring services.

### Primary Writing Requirement and Placement

All students at the University of Rochester, whether incoming freshmen or transfers, must satisfy the Primary Writing Requirement. The majority of students fulfill the requirement by earning a "C" or better in WRT 105, Reasoning and Writing in the College, or WRT 105E, a version of 105 chosen by students who need more support to meet the demands of college-level writing. Students who believe that they are already proficient college writers may petition to substitute a University of Rochester writing-intensive course for WRT 105/105E. The substitute course may not also be used to fulfill the upper-level writing requirement. Transfer students who have completed a WRT 105/105E-equivalent at another institution and received a "B" or better may petition to use this course to satisfy the primary writing requirement. For more information on satisfying the Primary Writing Requirement, including instructions on how to access the Writing Placement Survey, please refer to http://writing.rochester.edu.

Students admitted to the College through the ESOL Program fulfill the requirement by earning a grade of "C" or higher in WRT 103, ESOL Critical Reading, Reasoning, and Writing, and WRT 104, ESOL Research, Reading, and Writing. For more information on ESOL placement and courses, please refer to http://writing.rochester.edu/ESOL.

### COURSES

#### WRT 101. ESOL Speaking and Listening I.

This course is designed to help undergraduate nonnative speakers of English improve their English oral communication and listening skills in preparation for social interactions at the University. Students practice speaking at greater length and faster speed
by developing fluency, grammatical accuracy, complexity of sentence structures, and vocabulary. In addition, students practice listening actively to peers, summarizing, paraphrasing, and repeating key information from native speakers of English. The course also covers such techniques as asking follow-up questions, using socialization strategies, adapting to cultural differences, practicing small talk, and making formal and informal introductions. Class work takes place in and out of the classroom with the collaboration of native and nonnative speakers of English in formal and informal settings. Significant class time is devoted to English pronunciation. (Fall)

WRT 102. ESOL Speaking and Listening II.

This course builds upon the lessons from WRT 101, ESOL Speaking and Listening I, and is designed to help undergraduate nonnative speakers of English improve their English oral communication and listening skills in preparation for academic and social interactions. Students practice taking notes, summarizing, repeating, and critiquing key information from recorded lectures and presentations—with an emphasis on the discourse most prevalent in undergraduate university courses. Students also practice communicating in different academic, social, and cultural contexts as they engage in classroom conversation, debates, interviews, speaking to formal audiences, and giving academic presentations in English. Class work takes place in and out of the classroom with the collaboration of native and nonnative speakers of English in formal and informal settings. Class time is devoted to English pronunciation. (Spring)

WRT 103. ESOL Critical Reading, Reasoning, and Writing.

WRT 103 is an introduction to critical reading and writing skills. Lessons center on the analysis of varied readings and on using writing as a tool for critical thinking and reflection. Students are introduced to concepts of rhetorical analysis and the use of logic, as well as the roles of audience and purpose in shaping the organization, style, and argumentative strategies of their own papers. In addition, students build writing fluency and self-expression through freewriting and in-class writing. Collaboration is an important part of learning; therefore, students work together as they learn to critique their own work and the work of their peers. Attention is given to writing beyond the classroom, such as communicating with faculty and others across the College. (Fall)

WRT 104. ESOL Research, Reading, and Writing.

WRT 104 extends the critical reading and writing skills learned in WRT 103: ESOL Critical Reading, Reasoning, and Writing to the act of research. Research may include traditional library sources and academic journals, but it may also include primary research such as fieldwork, surveys, and interviews. A variety of texts are analyzed and discussed in preparation for constructing extended argumentative essays and a final research paper. Reading and responding critically to texts are practiced. Students learn how to incorporate source material into research writing and integrate their own ideas with those from other texts. Collaboration is an important part of learning; therefore, students work together as they learn to critique their own work and the work of their peers. Attention is given to writing beyond the classroom, such as communicating with faculty and others across the College. (Spring)

WRT 105 and WRT 105E both satisfy the Primary Writing Requirement with a grade of "C" or better. Each section has unique content. For an updated list of course descriptions, please refer to http://writing.rochester.edu.

WRT 105. Reasoning and Writing in the College.

WRT 105 introduces students to disciplinary writing at the college level through instruction in small sections that focuses on the act of writing. Section topics have ranged from “Adolescence: War or Peace” to “Searching for Whales: Myth, Science, and Ecological Sustainability,” and cover a range of subjects and disciplines. The course provides instruction and practice in clear and effective writing and in constructing cogent and compelling arguments, as students draft and revise numerous papers of different forms and lengths. Students consider the roles of audience and purpose in shaping the organization, style, and argumentative strategies of their own papers, while they learn to become critical readers of their writing through peer critiques and revision/editing workshops. (Fall and Spring)

WRT 105E. Reasoning and Writing in the College.

WRT 105E is an extended version of Reasoning and Writing in the College. While WRT 105 and WRT 105E have the same expectations for completion, WRT 105E is intended for students who decide that they need a more supported writing experience to meet the demands of college writing. All sections of WRT 105E include an additional class session each week and are taught in computer labs and limited to 10 students. WRT 105E students who have worked diligently but have not attained a “C” or better may take an incomplete and sign up for the WRT 105E Extension, a weekly workshop and tutorial that allows students to raise their final grades and satisfy the Primary Writing Requirement. (Fall and Spring)

WRT 108. Workshop in Writing.

This course offers ongoing practice and instruction in writing and critiquing writing. Guided by a writing center consultant, students plan, draft, and revise their writing; critique each other’s work; assess their own writing; and participate in group sessions on writing issues that the group faces. The semester’s work culminates in a final portfolio that features polished essays and an overall self-assessment. WRT 108 is a 2-credit course, which is graded pass/fail. Prerequisite: WRT 105/WRT 105E or alternative satisfaction of the Primary Writing Requirement. (Spring)


This course prepares sophomores, juniors, and seniors enrolled in five-year programs from the humanities, sciences, and the social sciences for work as writing fellows. The course design facilitates development of a strong, intuitive writer and speaker in order to become a successful reader, listener, and responder in
peer-tutoring situations. Ample writing and rewriting experiences, practice in informal and formal speaking, and the critical reading of published essays and student work enhance students’ abilities to become conscious, flexible communicators. Before tutoring on their own, students observe writing fellows and writing center consultants conduct tutoring sessions. On completion of the course with a “B” or better, students should be ready to conduct tutoring sessions as writing fellows. Prerequisite: satisfaction of Primary Writing Requirement and a minimum GPA of 3.0; by application only. (Fall)

WRT 271. Topics in Drug Development.
Americans today live longer and healthier lives than they did 50 years ago. Many of these health advances have been due to the discovery and development of therapeutic compounds (drugs). Despite these gains, there are still many health problems for which there are few therapeutic options. Thus, the development of new drugs to treat these diseases is the focus of intense effort. The course explores drug development approaches, including evaluation of natural products, screening compound libraries, and rational drug design. Students choose a topic, write short pieces that serve as building blocks for the final 10–15 page review article, and revise this paper at least once. This course satisfies one of the two required upper-level writing experiences. It is a half-semester course, meeting once weekly. There are significant out-of-class time commitments required for writing, revision, self-assessment, and peer-review. (Spring)

WRT 272. Developing a Professional Biology Writing Portfolio.
After completing a biology degree, many people apply to graduate or medical school, become laboratory technicians, or do work that in some way describes science to nonscientists. These options all require writing, although the particulars vary. In this class, students complete short writing assignments that tailor information about a single topic to different audiences. They then identify the area(s) where they would like to concentrate their efforts, and write and revise at least one significant piece of scientific writing. More than one piece may be required; the final project should contain 10–15 pages of writing (split as desired between projects). This course satisfies one of the two required upper-level writing experiences. It is a half-semester course, meeting once weekly. There are significant out-of-class time commitments required for writing, revision, self-assessment, and peer-review. (Spring)

Freshman Offerings

Students have maximum flexibility in course choice, the ability to start working toward a desired major from the first semester on and the opportunity to build a general foundation according to their own special interests. Assisted by an advisor, students 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 major. Others fulfill basic requirements for graduation and provide the first college-level steps toward a liberal education.

Freshmen also have the opportunity to enroll in Quest courses.

Quest courses involve exciting work with original materials and data and encourage conversation and collaboration between teacher and student and among students themselves. Because of the small size of most Quest courses, students interact closely with their classmates and professor.

In the humanities Quest courses, students delve into analysis and interpretation of primary sources such as letters, authors’ original writings and revisions, and films. In social sciences Quest courses, students scrutinize existing data, conduct research that yields new data, and learn techniques for data collection and analysis. Science and engineering Quest courses draw students into the generation and analysis of new experimental data.

When students study primary sources, their best insights typically occur when they review their material for a second (or third, or fourth) time. That’s why Quest courses feature “recursion,” the perspective of the second look.

For information about Quest offerings, see www.rochester.edu/college/CCAS/quest/.

Early Connection Opportunity

The Early Connection Opportunity (ECO) program is designed to assist students in acquiring the attitudes, skills, and social connections necessary to become successful University of Rochester students. The program provides supplemental academic support to selected pre-freshmen during a four-week summer program.

ECO is a residential program that takes place in the month of July. Students admitted through the Higher Education Opportunity Program are required to attend as a condition of admission, and others are invited who we believe would profit from the connections that can be made during this program. Enrollment is limited. No fees, no tuition, and no room and board costs are charged to participating students. Students are responsible for transportation costs to and from Rochester and all other personal expenses.

Model courses in selected areas, such as mathematics, writing, literature, and biology and chemistry are offered. A series of workshops on strategies and tactics to promote academic success and using the University’s computer facilities are also offered. Courses are taught by instructional faculty representing various departments in the University. Upon successful completion of ECO courses students earn 4 credits (the equivalent of one full college course). One or 2 credits may be earned in follow-up courses during the academic year.
Extra-Departmental Courses

Each semester the College offers a variety of courses that are unique or interdisciplinary in nature, reflecting the current interests of students and faculty. These courses are listed under the heading CAS in the Registrar’s Course Description/Course Schedule. Expanded descriptions of these and other noncredit professional and personal development courses are available from the Office of Summer and Part-time Studies in 4-214 Dewey or at www.rochester.edu/osp/.

Achievement in College Leadership

Committee on Achievement in College Leadership

Joseph P. Dinnocenzo, PhD (Cornell)  
Professor of Chemistry

Anthony J. Olek, PhD (SUNY, Albany)  
Senior Lecturer in Biology

Deborah Rossen-Knill, PhD (Minnesota)  
Director of College Writing Program

Vicki Roth, MA (Minnesota)  
Assistant Dean, Center for Excellence in Teaching and Learning

The Citation for Achievement in College Leadership Program offers students the opportunity to develop their leadership skills through “leadership experiences” that combine specific academic study with specific practical application.

Citation for Achievement in College Leadership

Requirements

Students interested in the citation need to successfully complete at least three different leadership experiences from the approved list available in the College Center for Academic Support. Each leadership experience has two components:

- An academic course (2-credit minimum) designed to prepare students for specific leadership work.
- A specific leadership practicum which implements ideas from the preparatory course.

The Citation for Achievement in College Leadership is administered through the College Center for Academic Support. Students who plan to enroll in the program should complete the registration form located on the College Center for Academic Support website. Ideally, students should register for the citation no later than the spring semester of the junior year or when they have completed at least two of the three required leadership experiences.

Upon graduation, students successfully completing the Citation for Achievement in College Leadership receive a notation on their official transcript.
The College

Actuarial Studies

Committee on Actuarial Studies

S.R.S. Rao Poduri, PhD (Harvard)
Professor of Statistics; Director of the Program in Statistics

Carl Mueller, PhD (Berkeley)
Professor of Mathematics

The College offers a certificate in actuarial studies for students contemplating a professional career in the insurance industry. The program is organized by a committee of representatives from the Departments of Statistics, Mathematics, and Economics, with one member designated as program advisor, and administered through the Multidisciplinary Studies Center. Ordinarily, interested students should apply by March 1 of their junior year.

Certificate in Actuarial Studies

Requirements

Five core courses

- STT 212 or ECO 231 (prerequisites for ECO 231: ECO 207; ECO 230, STT 213)
- MTH/STT 201 (prerequisites: MTH 162 or equivalent, MTH 164 recommended)
- MTH/STT 203 (prerequisite: MTH/STT 201)
- MTH 165 (prerequisite: MTH 143, 162, or 172)
- FIN 205 or MTH 210 (prerequisites: ECO 207, 230 or equivalent)

Three additional courses (totaling at least 9 credits)

- Two from the following list:
  - MTH 202, MTH/STT 208, 280, STT 216, 221
- One additional course, either from the above list, or the following list, or an approved substitute
  - ECO 236 or Independent Study (approved by the program advisor)
  - Independent Study (approved by the certificate program advisor)

For certification, students must complete these course requirements with a grade point average of 2.5 or higher. None of the certificate courses may be taken satisfactory/fail. In addition, some proficiency in a high-level computer language is required. Courses that may be used towards satisfying this requirement include CSC 170 or 171. (Please note: Course substitutions may be possible with the approval of the program advisor.)

Many insurance companies offer summer internships for students contemplating the actuarial profession. Such an internship may provide important additional training (as well as summer income).

The Society of Actuaries is the professional organization of actuaries in the United States and Canada. To become an Associate Member of the Society, one must pass a series of examinations. Some or all of these may be taken while employed, after college graduation; some may be taken while still a student. The first examination is in probability. Certificate students could, and are strongly encouraged to, take the first two examinations before, or upon, graduation. The exams are given three times a year: February, May, and November.
African and African-American Studies

Executive Committee

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Associate Professor of History

The Frederick Douglass Institute for African and African-American Studies sponsors programs of teaching and research at the undergraduate level. As part of the College, the Institute has a broad mandate in undergraduate and graduate education, advanced research, and exchange within the University community and beyond. It is the focal point for African and African-American studies at the University.

The undergraduate major in African and African-American studies (AAS) provides an interdisciplinary program of studies that integrates the social sciences (history, political science, anthropology, psychology, economics) and the humanities (English, modern languages and cultures, religion and classics, music, philosophy). Students follow a rigorous and closely monitored major designed to facilitate both broad exposure and in-depth mastery of a field which has, in the last 20 years, rapidly established itself as a crucial focus in a broad array of disciplines.

The major in African and African-American studies is multidisciplinary and interdepartmental. It brings together historical, cultural, psychological, economic, and political approaches and perspectives to the study of people of African descent in the Atlantic world, including the United States, the Caribbean, Latin America, Europe, and the African continent. The AAS major—which may be individually tailored to focus on either the humanities or the social sciences—appeals to students with primary interests in African and African-American studies as well as students working in more traditional, departmentally based majors who may major in African and African-American studies as an additional or double major. Many students already majoring in history, English, political science, comparative literature, anthropology, or similar disciplines find a second major in African and African-American studies an attractive option. Students majoring in engineering or the natural sciences may find a double major in African and African-American studies an enriching opportunity as well.

Institute courses are cross-listed with those of anthropology, economics, history, English, modern languages and cultures, political science, chemical engineering, women’s studies, and religion and classics.

In addition to the courses offered, the Institute sponsors an annual Residential Fellowship Program (postdoctoral and predoctoral).


BA in African and African-American Studies

A minimum of 10 courses is required, including the following.

- One of the following four introductory courses:
  - AAS 106 (HIS 106), Colonial and Contemporary Africa
  - AAS 110 (HIS 110), Introduction to African and African-American Studies
AAS 141 (HIS 165). African-American History I
AAS 142 (HIS 166). African-American History II

- Seven electives in African and African-American studies as indicated by AAS cross-listings.

Not more than two can be at the 100-level. At least four must be grouped in either the social sciences or humanities. At least one must address foundational or methodological issues in an established discipline; see the Curriculum Director for a list of possible courses that satisfy this particular requirement in specific disciplines.

- AAS 297. Colloquium in African and African-American Studies
- AAS 380. Senior Seminar (or a Senior Tutorial when the seminar is not possible).

The divisional identity of the AAS major (social sciences or humanities) will be determined by that of the majority of the students’ elective courses.

Minor in African and African-American Studies

- All students must take at least one of the following:
  AAS 141. African-American History I
  AAS 142. African-American History II or AAS 106. Colonial and Contemporary Africa
  AAS 110. Introduction to African and African-American Studies

In addition students must complete four additional courses in African and/or African-American studies at least three of which must be at the 200 or 300 level. These courses must include offerings in at least two different disciplines. A minor in AAS may satisfy a cluster requirement in either humanities or social sciences.

The divisional identity of the minor will be determined by the divisional identity of at least three of the students’ elective courses (excluding the one course history requirement and the required colloquium).

The Upper-Level Writing Requirement

The upper-level writing requirement is satisfied by the Colloquium and the Senior Seminar.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

104. Contemporary Issues and Anthropology.

This course explores the complex inter-relation of race, class, and gender in contemporary America, both in people’s subjective identities and in their objective life chances. The materials assigned include first-person narratives of particular life experiences; quantitative analyses of general statistical patterns; and long-term historical explanations of these experiences and patterns.

106. Colonial and Contemporary Africa.

This course uses film, literature, and historical studies to understand the transformation of African societies during the colonial era and its neocolonial aftermath. It maps out the forging of new national identities, creation of wage laborers, restructuring of rural communities, and changing power relations between women and men, the young and old. Students will also explore how African men and women, from their homes and workplaces, and as part of nationalist and liberation movements during and after the Cold War, have sought to redefine their place in the global economy amidst new opportunities and challenges presented by environmental degradation, the HIV/AIDS pandemic, hunger, international debt, and China’s growing thirst for the continents seemingly inexhaustible natural resources.

107. History of Islam.

The development 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.

110. Introduction to African-American Studies.

This course will serve as an introduction to the dominant methodologies and paradigms that constitute the field of African-American Studies. We will read a wide variety of texts across disciplines, including but not limited to: anthropology, history, philosophy, sociology, musicology, legal studies, literary studies, and visual studies. Central questions for us throughout the semester will be: What are some of the primary strategies for analyzing and imagining the Black experience in the U.S. and internationally? How is “Blackness” as a social category constituted and represented? What does the future hold for the field of African-American Studies? In addition, students will have the opportunity to develop and pursue their own lines of research.

122. History of Jazz.

This study of Jazz, as an American musical art form, will be structured around the lives and music of jazz musicians, across a range of instrumental, vocal, and ensemble genres. Course focuses on jazz titans, those individuals and musical groups distinguished by their seminal and permanent influences, such as Louis Armstrong, Miles Davis, or Coleman Hawkins or shorter intense careers, such as Charlie Parker. Blues, ragtime, swing, bebop, cool, progressive, and free jazz are landmark terms. And finally, study of the musical history will be enhanced by considerations from sociological, linguistic, and philosophical perspectives. The instructional format includes lectures, discussion and intense emphasis on listening. This course is designed for students with little or no musical training; simple technical, musical vocabulary and concepts will be provided. Reading, listening assignments, brief written assignments and two exams. No prerequisites. (Fall)
123. Music of Black Americans.

The course will study the Black American Christian musical beginnings and includes forms of worship, early musical practices, the Spiritual, evolution of Gospel. An examination of antebellum musical activities follows including secular song types, character of the folk music with respect to poetic and musical form, language and themes. Attention will be given to significant literary and aesthetic developments, especially during the Harlem Renaissance and the poetry of several writers of that era will be surveyed. The course will treat Blues, its origins evolution through the 1940s. Surveys of classical music forms from the 18th to mid-20th century; music of the theater from minstrelsy to Broadway; precursors of jazz, the syncopated dance orchestra and brass bands; early jazz to bebop round out the course offerings.

141. African-American History I.

After examining the primary features of pre-European African society we will assess the disruptions triggered by European arrival. A discussion of the “Middle Passage”—the transportation of enslaved Africans to North America—and the Africans’ adjustment to their new environment will compose the first section of the course. We will then focus on the process of “Americanization” as the Africans became African-Americans. The struggle for freedom and citizenship will conclude our survey. The course readings will be selected from autobiographies by African and African-American authors, and some brief selections from secondary texts. Using the autobiographies as historical source material, we will examine the values and cultural practices of Africans in America, and the ways in which African-Americans adapted to and shaped American life and culture.

142. African-American History II.

This course surveys African-American literature of a variety of genres—poetry, drama, autobiography, fiction, and non-fiction essays—from the 18th Century to the 20th. The course interprets this tradition not only as the production of American writers of African descent, but also as a set works that display formal characteristics associated with black cultural traditions. Discussion topics include the meanings of race, the construction of black identity, and intraracial differences of class, gender, and sexuality. Special attention will be paid to approaching literary texts from a variety of critical perspectives.

151. The Blues.

The course covers the history and influence of the music called “the Blues”; the origins of blues in the context of African American culture in the late 19th and early 20th centuries, the blues’ rapid rise to becoming the dominant popular music in the African American community, and the discovery of blues by white audiences. Class format combines lecture, listening and discussion.

156. Introduction to African-American Literature.

This course surveys African-American literature of a variety of genres—poetry, drama, autobiography, fiction, and nonfiction essays—from the 18th Century to the 20th. The course interprets this tradition not only as the production of American writers of African descent, but also as a set works that display formal characteristics associated with black cultural traditions. Discussion topics include the meanings of race, the construction of black identity, and intraracial differences of class, gender, and sexuality. Special attention will be paid to approaching literary texts from a variety of critical perspectives.


A study of the Interfaith Movement from the late 19th to the early 21st century, including issues of identity, religious conflict, and women’s voices.

158. Gospel Choir.

One rehearsal per week. Two concerts per semester. In addition, there may be off-campus performances in local colleges, churches, and other venues in the greater Rochester community. The Gospel Choir performs a varied repertoire of sacred music—spirituals, hymns, traditional and contemporary Gospel, music of the praise-and-worship genre. Students may register for credit or simply sing as choir participants. (Fall and Spring) (1 credit)

182. West African Dance Forms 1a.

A continuation of Dance 181 that allows the student to deepen their experience and hone their skills in West African Dance.

202. The Third World.

The concept of a Third World. The origins of colonialism and “underdevelopment” in the rise of European capitalism. The struggles of the colonial and postcolonial peoples for political independence, cultural autonomy, and economic development.

210. American Culture.

American Culture? Is there such a thing? This class will explore, discuss and debate this question and some more: If there is an American culture, how can we tackle it? How does anthropology, famous for its research away from home, help us understand current major debates in the United States? How do outsiders understand and evaluate American culture? Is there a return of religion to American public life? How do Americans address power relations, class, gender, ethnicity and race? To tackle these questions we will use assigned readings, films, and current events seen through print and electronic media.

220. Race and Gender in Popular Film.

This course explores Hollywood’s current fascination with race and gender as social issues and spectacles. In particular, we will focus on the ways that social difference have become the sites of increasingly conflicted narrative and visual interactions in our films. To examine competing representations of racial difference and sexual difference in contemporary US culture, we analyze popular films of the 1980s and 1990s, from thrillers to action films to comedies.
How do human beings experience, make sense of, cope with and shape birth, illness, and death in their own lives and in the lives of those who are close to them? Historical and contemporary examples from North America, Latin America, Europe, the Middle East, Africa, and Asia.

This course will examine the relationship between African Americans and the American political system in order to provide students with a broader perspective on the American political process. We will address issues of organizational resources and approaches, political leadership, representation, integrationist and separatist ideologies, and various strategies for African-American political empowerment.

This course is a study of Black Paris, as imagined by three generations of Black cultural producers from the United States, the Caribbean and Africa. Paris is as a space of freedom and artistic glory that African American writers, soldiers and artists were denied back home. For colonized Africans, and Caribbeans, Paris was the birthplace of the Negritude, the ultimate cultural renaissance influenced by the Harlem Renaissance. From Josephine Baker, Richard Wright, James Baldwin to Shay Youngblood's *Black girl in Paris*, from Aime Cesaire to Maryse Conde, from Bernard Dadie’s *An African in Paris* and to contemporary Franco-African writing, we will investigate how the representation of Paris functions in the construction of black identities. Readings include: *Black Girl in Paris* (Shay Youngblood), *Desirada* (Maryse Conde), *The Josephine Baker Story, Paris Noir: African Americans in the City of Light* (Tyler Stovall), and *An African in Paris* (Bernard Dadie).

227. Black Political Leadership.
Is President Barack Obama a black leader or a leader who happens to be black? Leads to understanding where the nation’s first African-American president fits in a long stream of black political thinkers, activists, and leaders.

230. Slave Narratives and Neo Slave Narratives.
Autobiography is the foundational genre in the tradition of African-American literature. It is also the genre that both illustrates and represents the process of the construction of identity. Autobiography is not only writing about a life authored by oneself, but also the life of the self made manifest in the form of writing. This course surveys the tradition of autobiographical writings by African Americans, from slave narratives to recent bestsellers, in order to promote an understanding of autobiography as a narrative form shaped by its historical context and the purposes of the author. In addition, the course provides students with insights into various topics in African-American culture and history. Readings include texts by Maya Angelou, Frederick Douglass, Olaudah Equiano, Zora Neale Hurston, Harriet Jacobs, Audre Lorde, Barack Obama, Booker T. Washington, Richard Wright, Malcolm X, and more.

231. African-American Drama.
Study of dramatic works by African-American playwrights during the twentieth and twenty-first century.

241. Major Author: Toni Morrison.
Toni Morrison has emerged as one of the most influential writers and critics in contemporary American culture. This course will approach her work from a broad range of critical perspectives including black feminist thought, psychoanalysis, trauma theory, Biblical exegesis, postcolonial analysis, and critical race theory. Although this class will emphasize rigorous study of her literary work, we will also pay close attention to her contributions to literary criticism, her role in public life as well as her forays into political and national debates. In our study of her novels, we will explore such issues as the importance of history and myth in the creation of personal identity, constructions of race and gender, the dynamic nature of love, the role of the community in social life, and the pressures related to the development of adolescent girls.

243. Muhammad and the Qur’an.
This course is a study of 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 are discussed together with interpretations of them found in Islamic legal, theological, philosophical, and mystical writings.

244. Mutilated Bodies, Mutilated Discourse.
‘Transnational sisterhood’ or cultural imperialism? Legitimate ritualized practice or outdated violent ritual? Genital cutting, female circumcision, female genital surgery? The controversy over this practice already begins with the act of its naming. If there seems to be a consensus about the physical violence imposed on the female body, why is it that western feminist discourse is suspected of perpetuating the mutilation African voices? This course seeks to provide an understanding of the context in which a fragmented ‘transnational sisterhood’ allows for a proliferation of mutilated discourses on mutilated postcolonial bodies. Readings and Films include Alice Walker (Warrior Marks), Florence Ayissi Fauziya Kassindja (Do They Hear You When You Cry), Maryse Conde and more critical and theoretical readings from African, French and North American authors. In English.

246. Cry Freedom.
Since the 1960s certain Christian theologians have attempted to re-think and re-express their religious beliefs in ways that can lead to the radical transformation of people’s lives and social institutions. The movement this group of diverse Christian thinkers has set in motion is often referred to as liberation theology. In this course, we will look at the principal ideas of various liberation theologians—Latin American, Asian, African, Afro-American, and feminist. As well as looking at the ideas of these thinkers, we will also examine the social worlds in which they think and write, thus trying to see the connection between their ideas and the social environments they want to liberate.

What is the impact of a new global economy on families, love and marriage in the United States and in other countries? Are there new forms of transnational marriage, love, families? Are families still seen as enduring/reassuring ‘building blocks’ of their respective societies? How does global labor migration of women and men affect families they leave behind? Does women’s migration change local understandings of gender roles, families and communities? In this new global context how do people view attachment to ‘place’?

249. The Civil War.

The course suggests that there existed two distinct views as to how the new nation would be structured. Once these views clashed and became sectional, the nation was thrown into a political, theological, and, ultimately, a military contest the demands of which led to the incorporation of structural changes that had the effect of resolving the very issues that had propelled the nation into war. As we identify and discuss the causes, conduct, and consequences of the Civil War, we will examine the changing ideas about nation, government, work, race, and gender, and ask: How different were Northern and Southern institutions and, to what extent were northern and southern Americans fundamentally different people?

250. Race in American Fiction.

This course provides a basic introduction to some of the major works and themes in American literature, focusing primarily on the development of the novel and short story, with limited attention to poetry and drama. We will begin in the nineteenth century and work our way through such contemporary writers as Toni Morrison and Tony Kushner. Our focus will be on the creation of a national identity and how issues of race, gender, class, and sexuality intersect in the formation of an American literary tradition. Students will trace a number of important themes such as the relationship between politics and art, the impact of slavery and the Civil War, immigration, the American dream and the development of a national mythology and ideology. In our study of various movements in the American literary tradition, we will also pay close attention to the intellectual debates concerning audience, language, and the purpose of art that have shaped key texts and historical time periods.

251. U.S. Latinos/Latinas.

This course introduces students to the emergent field of U.S. Latino/Latina writing and culture. Does the rich diversity of Latino communities in the United States—stretching from Los Angeles and the southwest to Miami and New York via Texas, Chicago, Minneapolis, and all stops in-between—frustrate or cancel any attempt to group their experiences under a single ethnic-racial term like “Latino/a”? What exactly is “the browning of the Midwest”? To what kind of gender, sexual, and racial codes are the inhabitants of these communities subjected? How do Latino/a narratives map the conflicted terrains of “utopias without borders,” free-trade zones, diasporas, nomadic workforces, and even the Internet? Latinos, Latin Americans, immigrants, exiles, refugees, border peoples, rafters—it is increasingly as difficult to define the legal status of individuals and communities as it is to talk about social, economic, and cultural identities.

252. Economies and Societies in Latin America.

Provides an historical explanation for the general problem of material poverty and the attendant sociopolitical crises that characterize contemporary Latin America and the Caribbean.


Economic development of African Americans during the twentieth century.

254. West African Dance Forms I.

Students will experience dancing African styles from the traditional cultures of Ghana and Guinea, West Africa. Technical emphasis will focus on foot patterns and placement, as well as developing the proper physical stance for African dance styles. Students will practice the dances and drum songs including Kpanlogo & Gota from Ghana, and Yankadi, Makru, & Kuku from Guinea, as well as various other selections. Outside work is required, including performance attendance, video viewing, article analysis, and journaling. Students can expect to gain a broadened perspective on contemporary West Africa and its cultural practices.

255. West African Dance Forms II.

This course will focus on the increasingly complex dance repertoires of Ghana and Guinea, West Africa. Technical emphasis will focus on foot patterns and placement, as well as developing the proper physical stance for African dance styles. Students will practice the dances and drum songs including Kpanlogo & Gota from Ghana, and Yankadi, Makru, & Kuku from Guinea, as well as various other selections. Outside work is required, including performance attendance, video viewing, article analysis, and journaling. Students can expect to gain a broadened perspective on contemporary West Africa and its cultural practices.

257. Lincoln, Douglass, and Black Freedom.

In what was probably the world’s greatest century, marked by several national and international struggles for human freedom, two men stand head and shoulders above the many great men and women who participated in a civil war for American freedom: Abraham Lincoln and Frederick Douglass. At first glance, these two men had little in common; one born free on the American frontier, the other unfree in the heartland of slavery. Yet they had much in common; both largely self-educated, they both attained a mastery for words and the ability to communicate simply and directly with their fellow man. As if born to fight in one major battle for human freedom, these two men traveled diverse roads to meet on a momentous battlefield: black freedom and the future of America. Utilizing a wide range of sometimes opposing tactics, each in his own way shaped nineteenth-century Americans’ understanding of what it meant to be free and a citizen.
This course will explore the history of African-American women from the 17th century to the present. African-American women developed a variety of responses to different economic, social, and political conditions in American society that depended on factors such as: the region they lived in, age, marital status, religious allegiances, class position, and political persuasions. Despite this diversity of experiences and identities African-American women continually contested the negative stereotypes presented in the dominant culture through political activism, social reform, and the sustaining of strong communities and families. In this class we shall explore the individual and collective actions of African-American women. We will focus on their personal stories, whether told through slave narrative, biographies, fiction or autobiography. By placing these individuals within their historical context we will gain a greater understanding of African-American women’s lives, and American history more generally.

In the context of the global economy, Nigeria, the most populous country in Africa, is blessed with vast mineral resources and agricultural lands able to produce a wide variety of tropical products and foods. The country’s large population is made up of talented and highly resourceful individuals, who are quick to respond to economic incentives. Thus, it is hard to understand why the country has one of the lowest per capita incomes in the world and why the country’s economy occupies such a lowly position within the global economy. We focus on the historical development of socioeconomic/political structures over time to explain why the giant of Africa continues to slumber. Some of the country’s central problems, such as ethnic and religious contradictions, are similar in some way to those in the U.S. The solutions attempted by the governments of both countries, such as affirmative action, are also somewhat similar. We will conduct a comparative analysis of contemporary historical issues in the two countries.

265. Comparative Perspectives on Race, Culture, and Politics.
Examines the formation of racial solidarity in the political sphere, state policies regarding racial inequality, and how race as a social construct operates as a political resource for racially dominated groups and for institutionalized political entities. The course covers the United States, South Africa, the United Kingdom, Brazil, and others.

This course explores the conditions that created the guerrilla movements, the way the rebels and government forces clashed in the air, cities, and jungles, and how the struggles reshaped the history of the region and its position in the global economy before and after the Cold War.

278. Birth and Death II: Making Populations Healthy.
This course examines programs carried out by governments, multilateral organizations, and non governmental organizations to deal with “public problems” connected to population: communicable diseases such as TB, malaria and HIV/AIDS; famine prevention and relief; child survival, especially malnutrition and infant diarrhea disease; safe motherhood; teen pregnancy; contraception, and abortion.

283. South Africa Since 1652.
After a three-week introduction, the course explores South Africa’s history from 1652 to the end of legal apartheid in 1994. The course focuses on broad themes regarding the birth and hardening of racial attitudes, land dispossession, industrial color bar, and urban segregation. It highlights African resistance in such forms as African independent church movements, political organizations, trade unionism, and the activism of black women and the youth. Finally, students will have the opportunity to examine major challenges facing the new South Africa, particularly poverty and the HIV/AIDS pandemic.

This course will focus on dances that pertain to the life-cycle of women. Students will experience dances that celebrate rites of passage such as coming of age, circumcision, marriage, and childbirth. Discussion will center around gender roles in the performance ensemble and the correlation of performance representations with the traditional lifestyle. Students will examine the cultural factors that contribute to the articulation of gender roles in postcolonial West Africa and the relationship of those roles to the performance ensemble.

Blue States! Red States! Why so many “Red States” in the South? Why such close attachment to family, religion, and community? Why such a penchant for a distinct music, food, and sports culture? Why has the region been for so long associated with social backwardness—violence, racism, and political conservatism? These and other characteristics (real or imagined) have roots that extend back to Europe and Africa while many are the result of more recent events dating back only a few generations. This course will address these and other questions in the search of historical answers to the roots of southern peculiarities and the origins of those “Red States.”

This course interrogates how the socially constructed category gender (merged with the socially constructed categories race and class) are implicated in the alleged school-to-prison pipeline. The chosen texts explore and analyze this connection with specific reference to prison “…as the new form of slavery.” Using a plethora of academic/popular media and texts, including ethnography, videos, memoir, autobiographical data, literature and legal and non legal documents coupled with personal narratives, the course seeks to fortify student participants with the skills and
anthropological insights needed to complete an ethnographic study of a prison or a prison-like structure in order to answer the overarching question: If gender is socially constructed, what happens when it goes to jail?

This course is a study of major Caribbean novels and major theoretical texts. The reading will be structured around the notion of Antilleanite or Creolization elaborated by Martinican Edouard Glissant and his heirs Chamoiseau and Confiant of the Creolite movement. The controversial presence of the Other (Africa and France) in the Caribbean, the need to build a Caribbean authenticity in order to participate freely in what Glissant Glissant terms Relation planetaire (Planetary Relations) will also be thoroughly examined.

This course identifies and discusses a selection of texts considered crucial for the understanding of the black experience from 1610 to the present.

335. Political Economics of Food in Africa.
A three-part exploration of the idea that in the world of African peasants food does not have an independent life apart from the social relations of those who eat it. Part I traces the social biography of food as it moves from the field to the table; Part II seeks to understand whether and to what extent the daily and seasonal processes of Part I acquired new meanings and long-term historical trajectories as a result of Africa’s engagement with the global economy, and Part III recasts the issues raised in Parts I and II into a debate between peasant intellectuals and professional historians.

After a discussion of the Moynihan Report controversy and an assessment of the literature on the black family, the readings will investigate why and how stable black families were encouraged, and how they developed under slavery. The impact of factors such as economics, politics, religion, gender, medicine, and the proximity of free families, on the structure of the black family will be given special attention. In this way, the structure of the slave family on the eve of Emancipation, and its preparedness for freedom, will be tested and assessed. Students will be encouraged to identify persistent links between the “history” of slavery and the black family, and the development of social policy.

Is a study in Atlantic World history beginning with a comparative examination of the economic, cultural, and political conditions in the major regions of the Atlantic in the mid-15th century. It proceeds systematically to analyze the expansive economic activities which followed the Portuguese and Spanish explorations and the colonization of the Americas. These activities had far-reaching economic, political, and cultural consequences in all regions of the Atlantic, with the emergence of an integrated Atlantic economy in the 19th century as the climax point. We focus centrally on the scholarly debates concerning the differential paths of development followed by the regions and countries of the Atlantic basin and the cultural mixtures (African, European, Americas) which evolved and conclude with a general discussion of the significance of these developments in the Atlantic World for the evolving global system. Student performance is evaluated on the basis of literature reviews and a term paper.

371. Evolving World Economic Order Since the Sixteenth Century.
Seminar course. Course deals with the economic relations between the developed and less developed parts of the world since the sixteenth century.

375W. Atlantic Slave Trade and Africa.
Seminar course. Examines the level of socioeconomic development in Africa by the late fifteenth century, relative to the other major regions of the world at the time. The effects of the “production” of captives for export on social and political structures, and the overall economic consequences of the trade in Africa are also examined.

380. Senior Seminar.
Prerequisite: permission of the department.
Students will draw upon their exposure to the theory methods of AAS to produce an interdisciplinary research paper on a topic of their own choosing. Open only to senior majors.

INDEPENDENT STUDY AND RESEARCH

391. Independent Study.
Independent studies on some aspect of the problems of energy resource development in lower-income countries, solutions to it, and relationship to development issues, including work with the instructor’s Access to Hydrocarbon Energy for African Development project, can be done within this course.

393. Senior Project.
May be an independent course with a faculty sponsor or may be taken in an advanced research 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 the area.

394. Internship.
Experience in an applied setting supervised on site. Approved and overseen by a University instructor.
American Sign Language

Professor
Elissa L. Newport, PhD (Pennsylvania)
George Eastman Professor of Brain and Cognitive Sciences and Professor of Linguistics

Associate Professor
Ted Supalla, PhD (California, San Diego)
Associate Professor of Brain and Cognitive Sciences and of Linguistics; Director of the ASL Program

Senior Lecturer
Guillaume Chastel, MA (Gallaudet)
Senior Lecturer in American Sign Language

Tourangeau Norma, MA (Boston)
Senior Lecturer in American Sign Language

Part-time faculty also teach several of the basic language courses.

The American Sign Language Program provides students the opportunity to develop an integrated base of liberal arts and sciences in the study of American Sign Language (ASL), the indigenous visual-gestural language developed and used by the Deaf community in most areas of North America. The program offers a major, minor, and clusters in American Sign Language.

Language Instruction
The program offers five semesters of language instruction in ASL, which gives students sufficient facility in the use of ASL to converse with ease and to pursue advanced study of the structure of signed languages, and of deaf people, their history, cultural institutions, and literary achievements. Except where indicated, the advanced courses in the program require basic competence in ASL, as lectures and classroom discussions are conducted exclusively in ASL without interpretation into spoken English.

Advanced Courses of Study
The student is expected to meet a level of ASL fluency (by completing ASL 105 or 106 or with permission of the instructor) before taking any advanced course, except where indicated. Students can choose 200-level courses from a variety of areas. Literature courses examine literary forms of ASL of all kinds, from poetry to theater. Culture courses permit the student to understand and appreciate the heritage of deaf people in America. Language sciences courses provide further study of ASL itself—its production, history, and structure. The ASL Program thus offers a strong educational foundation for students interested in entering the field of deafness as sign language interpreters, instructors, counselors, government specialists, audiologists, speech pathologists, program administrators, community service personnel, and many other positions, or for entering advanced study in the cognitive and language sciences.

BA in American Sign Language
ASL 101. Beginning American Sign Language I
ASL 102. Beginning American Sign Language II
ASL 105. Intermediate American Sign Language I
ASL 106. Intermediate American Sign Language II
ASL 203. Advanced American Sign Language
ASL 200. Signed Language Structure

Six Advanced Elective Courses
ASL majors are required to take two courses on literary and cultural aspects of ASL, two courses on linguistic and psycholinguistic aspects of ASL, and two additional courses from either of the two groups above, or from pedagogy and related topics.

Minor in American Sign Language
The minor in ASL requires six classes: three basic/intermediate-level language classes (ASL 101, 102, and 105), and three elective courses selected from the core and elective courses. The purpose of this minor sequence is to provide students with basic knowledge of the rich heritage of deaf people and their language and to enable students to think critically about what it means to be a member of the deaf community.

Upper-Level Writing Requirement
ASL majors can satisfy the upper-level writing requirement by taking two of the following courses: ASL 200, ASL 201, ASL 220. These courses include substantial writing assignments where the instructor provides feedback allowing the student the opportunity to rewrite assignments.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

Note: To maintain signing skills, ASL students must continue to take classes in which the language of instruction is ASL: ASL 101–106, and the 200-level ASL classes (not including ASL 208 and 260). To enter any of these classes, students must have taken a signing class in the immediately preceding semester or obtain permission of the instructor.

101. Beginning American Sign Language I.
An introductory course in American Sign Language as developed and used by the Deaf community in most areas of North America. It consists of a preparatory phase to attune students to communication in the manual-visual mode, followed by instruction and practice in vocabulary, sentence structure, elementary conversation, and literature. In addition, the course provides a survey of various issues raised by examining ASL and the Deaf community.
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 signing space; further use of non-manual components of ASL grammar, including facial expression and body postures, and introduction to conversational regulators. Discussion of regional and ethnic sign variations, and social, political and educational institutions of the Deaf community. Interaction with members of the Deaf community in both directed and non-directed activities will be featured.

105. **Intermediate American Sign Language I.**

This course emphasizes further development of receptive and expressive skills. Introduction to language forms used in ASL poetry and to the features of culture as displayed in art and theater.

106. **Intermediate American Sign Language II.**

This course consists of intensive use of expressive and receptive skills in complex grammatical structures, dialogues, and storytelling.

110. **Comparative Study of French Sign Language.**

This course focuses on the development of basic LSF vocabulary, fingerspelling, numbers, visual-gestural communication, and basic conversational skills. Cultural behaviors of the Deaf Community in France will be introduced in various and appropriate situations.

113. **French Sign Language and Deaf Culture in France.**

A unique study abroad experience in France for Deaf and hearing college-level ASL students and professionals. An opportunity to learn French Sign Language and French Deaf Culture in a formal setting and further your understanding of the international Deaf World. A native Deaf French faculty member from UR is affiliated with several faculty members at the University of Paris 8th and they jointly plan the program, schedule, and curriculum offered to ASL students and professionals. Written and spoken French are not required.

200. **Signed Language Structure.**

An examination of signed languages and the cognitive constraints that shape them, through a detailed consideration of the structure of American Sign Language and other natural signed languages of the world. Includes training in sign language notation and analysis. Satisfies the upper level writing requirement.

201. **Introduction to ASL Literature.**

Study of selected videotapes and films ranging from the early 1900s to the present. Emphasis will be placed on historical background, meaning of the story content, discussion of grammatical features and styles revealed in these contexts. Satisfies the upper level writing requirement.

202. **History and Culture of American Deaf Community.**

Discussion of various aspects of the American Deaf culture, including descriptions of deafness, and the Deaf community.

203. **Advanced ASL.**

This advanced language course focuses on advanced ASL grammar, providing students practice in expression and comprehension skills in both conversational and formal registers. Hands-on exercises include the descriptions of complex and abstract concepts and advanced argumentation techniques.

204. **Theory and Practice of Sign Language Interpreting.**

This course introduces students to the theory and practice of Sign Language interpreting in the United States. This survey will provide students with the tools necessary for understanding: (1) the history of sign language interpreting and its impact on current models of interpreter processing, (2) the work that interpreters do, (3) the ethical foundations of the field, and (4) the multifaceted issues related to working across languages and cultures.

205. **Art of Translation ASL and English.**

Introduction to the study of meaning-based translation with a focus on the analysis of ASL texts and the development of written English translations.

208. **Language Development.**

Basic introduction to children's language development; including the acquisition of phonology, syntax, and semantics. Focuses on the acquisition of a first language by young children, and compares the acquisition of various spoken and signed languages to find possible universal principles of language learning. No signing skills required. Students should have a background in at least one of the fields pertinent to the course: language structure, psycholinguistics, cognitive science, developmental psychology, or general psychology.

209. **Teaching ASL as a Second Language.**

This course is designed to provide an understanding of how sign language is taught in various settings and to explore current methods and theories. Students learn about the history of sign language teaching and resources to support such efforts. Students are provided opportunities to practice basic teaching techniques and select appropriate materials to introduce cultural and grammatical features in lessons.

210. **Narrative and Poetic Styles of ASL.**

This course examines techniques for telling stories or creating poetry in ASL. Eye gaze, role shifting, spatial referencing, and appropriate use of classifiers in storytelling will be featured. ASL poems on videotape will be analyzed for their poetic devices and elements. Guest lecturers will demonstrate related forms of expression, such as “signlore,” signing for the stage, and nonverbal
communication. Students will be given the opportunity to create literary forms from their personal experiences, as well as from well-known sources, throughout the course with guidance from the instructor.

**250. Sociolinguistics of Deaf Community.**

Investigation of language attitudes, language policy, language use in society, and discourse analysis.

**260. Language and Psycholinguistics.**

An overview of the nature and processing of human languages, including comparisons between language and animal communication systems, a consideration of the biological bases of human language, and discussion of the cognitive mechanisms used in producing and understanding language. Students taking this course should have a background in at least one of the fields pertinent to the material of the course: language structure, psycholinguistics, cognitive science, or general psychology.

**280. Deaf-Related Careers.**

Bringing together historical information and career preparation strategies for teaching, service provision and other related fields, this course is designed to provide an understanding of signed language as used in various settings and to explore professional service approaches to the Deaf community. The course also provides an overview of topics ranging from child language development to brain-cognition relationships, from educational interventions to technological advances, and social, psychological and linguistic characteristics of Deaf communities and sign languages.

**290. Assessment and Diagnosis of ASL Competency.**

Examination of various diagnostic tools used for assessing sign language fluency. Guided fieldwork experience in ASL diagnosis with an emphasis on data gathering and analysis.

**391. Independent Study.**

**ADDITIONAL COURSES**

**110. Introduction to Linguistic Analysis.**

This course introduces students to the study of the structure of human language. We will cover the six core areas of linguistic investigation: Phonetics (articulation, acoustics, and perception of speech sounds), Phonology (sound patterns), Morphology (internal structure of words and their organization in the mental lexicon), Syntax (internal structure of phrases and sentences), Semantics (word and sentence meaning), and Pragmatics (language use in context). The course focuses on developing skills in the areas of linguistic data analysis and interpretation of linguistic data in ways that aim to address theoretical and empirical issues in the study of language.

**172. Development of Mind and Brain.**

Introduces human development, focusing on the ability to perceive objects and sounds, to think and reason, and to learn and remember language and other significant patterned stimulation. Includes the nature and mechanisms of development in humans and an overview of what is known about brain and behavioral development in other species.

**221. Audition.**

Examines the physiological substrate responsible for hearing. Topics include the physical stimulus for hearing, receptive aspects of speech and language, peripheral physiology (the outer and middle ears, cochlea, and auditory nerve), and central physiology (brainstem nuclei, auditory cortex, descending systems). Introduces electrophysiological techniques used to study auditory function, and explores sensory and perceptual correlates of physiology and sensorineural hearing loss.
American Studies

Joan S. Rubin, PhD (Yale)
Professor of History; Director of Graduate Studies

The American studies major offers students the opportunity to examine American history, culture, and social life within an interdisciplinary framework. This approach, drawing on faculty members in departments such as English, art and art history, political science, religion and classics, music, anthropology, philosophy, history, and film and media studies, allows for especially rich explorations of such topics as the arts in American society, race, class, gender, ethnicity, and religion as aspects of American identity; and ideas and institutions that have shaped the United States, past and present. The major enables students to range freely across disciplinary boundaries while developing an area of focus. Students also consider the role of the American nation in a global context.

Goals of the Major

- Mastery of critical reading, thinking, and expository writing skills, as practiced by the constituent disciplines. These include close analysis of historical and literary texts, interpretation of evidence, understanding of different points of view, and the construction of arguments.
- Mastery of the theories and methods of research in one or more of the major’s constituent disciplines.
- Mastery of ability to synthesize diverse materials across disciplinary boundaries in order to explore intellectual questions.
- Appreciation for both diversity and commonality in the United States, past and present.
- Understanding the role of the United States as a global actor.
- Preparation for participating in American democracy as a liberally educated citizen.
- Preparation for careers such as law, social service, teaching, art, business, and any endeavor that demands clear, cogent thinking and writing.

BA in American Studies

American studies is a 10-course interdisciplinary major. Students who complete 6 of the 10 courses in the humanities (H) will fulfill the College's humanities requirement; students who complete 6 of the 10 courses in the social sciences (S) will fulfill the social science requirement.

A minimum of 10 courses is required.

Introductory Courses (two courses)

ENG 151. Introduction to American Literature (H)
One from the following:
- HIS 251. American Culture to 1876 (S)
- HIS 252. American Culture since 1876 (S)
- HIS 267. American Thought, 1600–1865 (S)
- HIS 268. American Thought, 1865–1990 (S)

American Studies Seminar (one course)

AMS 200. The Idea of America (H)

Interactions of America (one course)

At least one course that examines the interaction of America with other cultures. This requirement may be fulfilled using a course within the Specialization section or with the Capstone Research or Elective course.

Specialization (five courses)

Five courses from one of the following specialized tracks. In order to make the tracks interdisciplinary, only three of the courses can be in the same discipline (ex., no more than three history courses).

The Arts in American Culture

Except for the HIS courses below, all courses in this track are in the humanities.
- AH 213. Race and Gender in Popular Film
- AH 214. Beyond the Boundaries: Folk, Outside, and Visionary Arts
- AH 237. Modern Architecture and Frank Lloyd Wright
- AH 255. American Art/HIS 263. Arts in American Culture
- AH 256. Vernacular Architecture in the USA
- AH 259. Women, Cloth, and Culture
- AH 266. African-American Visual Culture
- AH 274. Cultural History of American Architecture
- AH 276. Gender and Representation in Native American Art
- AH 280. Native American Art and Religion
- AH 281. Art and the City
- AH 284. Modern Architecture and Urbanism: LA Modern
- AH 288. Art of the Colonial Encounter
- AH 285. The Visual Culture of Heritage and Identity
- MUR 122. History of Jazz
- MUR 123. Music of Black Americans
- MUR 125. History of Rock Music
- MUR 127. The Blues
- MUR 133. Musical Theater Workshop
- MUR 135. Sondheim and the Modern Musical Theater
- MUR 233. Advanced Musical Theater Workshop
- REL 151. The Blues
- REL 220. Jewish Women’s Writing
- ENG 116. Intro to African-American Literature
ENG 225. American Romantics
ENG 226. American Realists
ENG 227. American Moderns
ENG 228. African-American Drama
ENG 230. Studies in American Literature

**Upper-Level Courses in American Literature**
FMS 213. Race and Gender in Popular Film
FMS 222. Art and the City: New York in the 1970s
HIS 251. American Cultural History to 1865 (S)
HIS 298. Music-Made America (S)
HIS 307. Transatlantic Twenties (S)
HIS 311. History of American Popular Culture (S)
HIS 313. The Power of Print (S)
HIS 317. American Culture in the Great Depression and World War II (S)
HIS 381. Topics in Nineteenth-Century American Culture (S)
HIS 382. Topics in Twentieth-Century American Culture (S)

**Identity and the American Nation**
AH 214. Beyond the Boundaries: Folk, Outside, and Visionary Arts (H)
AH 259. Women, Cloth, and Culture (H)
AH 260. Cultural Tourism (H)
AH 276. Gender and Representation in Native American Art (H)
REL 151. The Blues (H)
REL 167K. Speaking Stones (H)
REL 178. Religion and American Foodways (H)
REL 214. Imagining the Jew (H)
REL 216. Jews and Multiculturalism in America (H)
REL 220. Jewish Women’s Writing (H)
REL 236. Catholicism in American Life (H)
REL 238. Native American Art and Religion (H)
SP 282. U.S. Latinos/Latinas (H)
PHL 209. Interest Groups in America (S)
PHL 224. African-American Politics (S)
PHL 237. Domestic Social Policy (S)
PHL 225. Race and Political Representation (S)
PHL 221. Philosophical Foundations of American Revolution (H)

**American Thought and Institutions**
Except for PHL 221, all courses in this track are in the social sciences
PHL 221. Philosophical Foundations of American Revolution (H)
HIS 145. Early America
HIS 146. Democratic America
HIS 147. Industrial America
HIS 148. Recent America
HIS 245. The City in American History
HIS 260. Progressive America
HIS 267. American Thought, 1600–1865
HIS 286. American Foreign Relations
HIS 305. American Health Policy and Politics
HIS 308. Modernity and Modernism
HIS 309. History of Psychoanalysis
HIS 312. Topics in American Social Thought
HIS 315. American Thought
HIS 374. Rochester and Its Radicals
HIS 377. Topics in Early American History
HIS 378. Topics in American History
PSC 103. Great Debates in American Democracy
PSC 105. Introduction to American Politics
PSC 121. Democracy in America
PSC 194. Rochester Politics and Places
PSC 209. Interest Groups in America
PSC 210. Development of the American Party System
PSC 212. Supreme Court in U.S. History
PSC 213. The U.S. Congress
PSC 215. American Elections
PSC 216. Legislative Politics
PSC 218. Emergence of the Modern Congress
PSC 222. The Presidency
PSC 224. African-American Politics
PSC 225. Race and Political Representation
PSC 237. Domestic Social Policy
PSC 249. Sports and the American City
PSC 275. American Foreign Policy
PSC 291. First Amendment and Religion in America
Capstone Research (one course)
A capstone research experience consisting of one course that involves writing a major research paper, either within a departmental course or as an independent study project. This course satisfies one-half of the upper-level writing requirement. All history courses numbered 350–399 offer this opportunity, as do upper-level courses in other departments which include a “W” section.

One Writing-Intensive Elective (one course)
This elective fulfills one-half of the upper-level writing requirement. Students may choose any upper-level writing course on America, including taking an additional course in their specialization.

Anthropology

Professor:

Anthony T. Carter, PhD (Cambridge)
Professor of Anthropology

Robert J. Foster, PhD (Chicago)
Professor of Anthropology and of Visual and Cultural Studies

Thomas P. Gibson, PhD (London School of Economics)
Professor of Anthropology

Associate Professor:

Ayala Emmett, PhD (Rochester)
Associate Professor of Anthropology

Signithia Fordham, PhD (American University)
Associate Professor of Anthropology

Ernestine McHugh Piskáčková, PhD (University of California, San Diego)
Associate Professor of Anthropology and of Humanities, Eastman School of Music

Eleana J. Kim, PhD (NYU)
Assistant Professor of Anthropology

John Osburg, PhD (Chicago)
Assistant Professor of Anthropology

Daniel Reichman, PhD (Cornell)
Assistant Professor of Anthropology

Professor Emeritus:

Edward E. Calnek, PhD (Chicago)
Professor Emeritus of Anthropology

Grace Harris, PhD (Cambridge)
Professor Emeritus of Anthropology and of Religion

Rene Millon, PhD (Columbia)
Professor Emeritus of Anthropology

Walter Hinchman Sangree, PhD (Chicago)
Professor Emeritus of Anthropology

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

Anthropology is the comparative study of humanity. At its broadest, it seeks to understand the origin and diversification of human adaptations to the natural and social environment. Thus physical anthropologists study the evolution of human anatomy and archeologists study the artifacts left behind by human manipulation of the natural world. But the most complex and diverse products of human activity are the languages, social relations, and cultural meanings humans have developed. It is these invisible artifacts that linguistic, cultural, and social anthropologists study. The Department of Anthropology at the University of Rochester specializes in this aspect of humanity: the comparative study of contemporary human cultures and societies.

The Department of Anthropology offers programs of study leading to the BA degree and to the BA degree with honors.
Students may minor in anthropology by following one of the two plans described below.

**BA in Anthropology**

Ten courses are required for a major in anthropology of which at least EIGHT must be at or above the 200 level. These 10 courses must include the following:

- ANT 101, Cultural Anthropology, normally taken BEFORE the spring semester of the sophomore year
- ANT 201, Theory and Method in Anthropology, normally taken in the spring of the freshman or sophomore years (prerequisite ANT 101)
- At least two of the core courses in anthropology: ANT 202–205
- One course that fulfills the Senior Requirement:
  - ANT 301–310, Advanced Topics
  - ANT 390, Supervised Teaching (for ANT 101, Cultural Anthropology, only)
  - ANT 393, Honors Research in Anthropology

**Honors in Anthropology**

The honors program is for students who wish to deepen their concentration in anthropology through an extra 12 credits of research and coursework. Application to the honors program should be made during the junior year. Students must complete:

1. A substantial research project (a minimum of 4 credits of honors research) and
2. 8 credits of further coursework (as described below). Research projects may involve archival, library, and/or original ethnographic research; they may incorporate research conducted during study abroad or summer field schools.

**Requirements**

Students wishing to graduate with honors in anthropology must fulfill the normal requirements of the undergraduate major. In addition, they must do the following:

- Maintain a GPA of 3.7 or higher in courses completed at the University of Rochester for the anthropology major, including courses completed for honors as listed below.
- Submit Part I of the application no later than April 15 of the spring semester of their junior year and obtain the signature of a departmental faculty member who has agreed to supervise their honors research project. Another member of the anthropology faculty must also agree to serve as a secondary reader for the project at this time. (Application forms will be available in the departmental office, 440 Lattimore.) Faculty supervisors will assume responsibility for advising students on their research and evaluating the final project.
- Complete a third core course in anthropology (ANT 202–205). An advanced topic seminar (30x) may be substituted for one core course in the junior or senior year.
- Submit Part II of the application, including a project proposal, to the departmental faculty member who has agreed to supervise their honors research project no later than the third Friday of September, fall semester of the senior year.

Acceptance into the honors program is subject to review by departmental committee. (Proposal forms will be available in the departmental office.)

- Complete a minimum of 4 credits of ANT 393, Honors Research in Anthropology. (These credits may be distributed between the fall semester and spring semester of the senior year.) Students enroll for these credits with their faculty supervisor.
- Complete 4 credits of elective anthropology at the 200 level or higher. These credits may include ANT 393 credits above the minimum of 4. Independent study credits are also acceptable.
- Submit to their faculty supervisor and secondary reader an acceptable honors research project by April 1 of the senior year and present and defend the project at a colloquium open to all faculty and students in the Department of Anthropology. Projects usually take the form of a thesis of approximately 10,000 to 15,000 words; the thesis ought to be of at least A– quality. Projects may also be completed in nonprint media, such as video, with the approval of the students’ supervisor. The award of an honors degree is decided by the supervisor and second reader, in consultation with the department faculty.

**Minors in Anthropology**

**Anthropology**

- Six courses are required.
  - ANT 101. Cultural Anthropology
  - Two of the following courses in anthropology: ANT 201–205
  - Three additional courses in anthropology, two of which must be at or above the 200 level

**Medical Anthropology**

- Six courses are required.
  - Two of the following courses in anthropology: ANT 201–205
  - Three of the following courses in medical anthropology: ANT 101, 102, 216, 218, 220, 278
  - Any one additional course in anthropology

**Upper-Level Writing Requirement**

In addition to fieldwork, writing is central to the practice of social and cultural anthropology. Instructors give particular attention to techniques of analytical and persuasive writing in the core courses required of all majors. Students are provided opportunities across the anthropology curriculum to write field notes, journals, exegetical essays, original ethnographies, and substantial research papers. Accordingly, the upper-level writing requirement is fulfilled by virtue of completing the requirements for the major in anthropology.
Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

INTRODUCTORY COURSES

These courses are usually open to first- and second-year students only.

101. Cultural Anthropology.
Provide an understanding of cultural variation and how anthropologists interpret it.

102. Introduction to Medical Anthropology.
Exploration of anthropological interpretation, research, and writing on the ways different peoples understand and deal with issues of illness and disease.

104. Contemporary Issues and Anthropology.
The complex inter-relation of race, class and gender in contemporary America, both in people’s subjective identities and in their objective life chances.

CORE COURSES IN ANTHROPOLOGY

201. Theory and Method in Anthropology.
A survey of major developments in anthropological thought. Explore the relationship between sociocultural theory and the methodologies used by anthropologists to conduct ethnographic research.

202. Modern Social Theory: Key Texts and Issues.
A close textual analysis of three founders of modern social theory—Marx, Durkheim, and Weber—and of the use made of their works by contemporary social scientists.

203. Ritual, Myth, and Scripture.
Major anthropological approaches to the study of the symbolic knowledge embedded in life-cycle rituals, origin myths, and religious scriptures.

204. Ethnographic Themes.
The role ethnographic texts play in posing and answering questions about human culture and society.

205. Theories and Debates in Anthropology.
Contemporary and historical debates which have shaped theory and method in cultural anthropology, showing how they have shifted over time and differed between national traditions.

SENIOR REQUIREMENT COURSES

These courses are primarily for anthropology majors in their junior and senior years.

301–310. Advanced Topics.
Prerequisite: ANT 201.

390. Supervised Teaching.
For ANT 101, Cultural Anthropology. By application only. The TA program requires students to work in teams and to lead group discussion.

393. Honors Research and Anthropology.

INDIVIDUALIZED STUDY OPTIONS

390. Supervised Teaching.
For ANT 101, Cultural Anthropology. By application only. The TA program requires students to work in teams and to lead group discussion.

391. Independent Study.

392. Practicum in Anthropology.

393. Honors Research and Anthropology.

394. Internship.
Internships will be graded on a pass/fail basis only.

TOPICS IN ANTHROPOLOGY

110. Introduction to Linguistic Analysis.
Investigates the structure of human language, covering the basic techniques and concepts in the subfields of contemporary linguistic analysis.

213. World Music.
Some of the world’s major music traditions, including theater music from China and Japan, Indian and Indonesian classical music, ritual and ceremonial music from West Africa, Eastern Europe, and the United States. Focuses on musical sound structures as well as social, political, and religious contexts for musical performances.

214. Love, Friendship, and Community.
A neurosociological perspective on strong interaction and strong personal ties—high-frequency social dynamics marked by strong mutual coupling.

What does it mean to be an individual? Examination of the shaping of experience in culture.
216. Medical Anthropology.
Cultural and social dimensions of health and illness including the political and economic dimensions.

How do human beings experience, make sense of, cope with and shape birth, illness, and death in their own lives and in the lives of those who are close to them? Historical and contemporary examples from North America, Latin America, Europe, the Middle East, Africa, and Asia.

220. Healing and Ritual.
The symbolic dimensions of healing are examined by looking at the use of ritual procedures as a form of healing.

Anthropological approaches to the environment will be broadly defined.

224. Anthropology of Development.
Major trends in the anthropological study of international development through ethnographic case studies from around the world.

225. The Social Uses of Media.
An anthropological perspective to the study of media. We will examine constructions of media as objects of social scientific analysis, as both textual artifacts and social practice.

226. Culture and Consumption.
Anthropological approaches to the study of mass consumption and material culture. Specific topics for investigation include: possessions and personhood; the history of modern consumerism in the West; fashion and social status; and the globalization of markets.

227. Local and Global Market Research.
Focuses on understanding consumer behavior in terms of cultural symbols and values. It shows how an ethnographic approach to market research contributes to development of marketing and advertising strategies.

228. Women, Cloth, and Culture.
An inquiry into women's predominant roles as textile artists, particularly in the Americas.

229. War and Migration.

Contemporary ethnographies of Latin American migration, globalization, transnationalism, and international justice.

Cosmological visions and ritual processes of different South Pacific societies. Topics for discussion include: myth, magic, sorcery, rites of passage, cargo cults, Christian missionization, and Millennial anxieties.

244. Marriage, Families, and Communities in a Global Perspective.
What is the impact of a new global economy on families, marriage and communities around the world and in the United States? Are there new forms of transnational social relations, marriage, love, families?

245. American Culture.
Major debates that occupy American public life in areas such as politics, religion, health, and the media.

The impact of capitalism on African socioeconomic institutions during and after the era of formal colonialism.

Tibet and Himalayas have long held a fascination for people in the West as exotic, enchanting, and dangerous lands. What do such fascinations reveal about the aspirations, fantasies and prejudices of those who experience them? How much do they reflect or distort the lives of those portrayed?

The history of Asian immigrants and Asian-Americans in the United States and Hawaii in the nineteenth and twentieth centuries.

252. Women in East Asia.
A history of women in the family, women and work, and women in society in three East Asian cultures. Same as HIS 296

Adopts an anthropological approach towards understanding the dramatic sociocultural transformations that have followed in the wake of China's post-Mao economic reforms.

This examination of selected spiritual and artistic traditions of the indigenous peoples of North America will range from the Canadian arctic to the desert southwest, as we look at various ways in which the visual arts articulate religious and philosophical systems of thought.
The transformations of the world religions during the colonial and post-colonial periods in the countries bordering the Indian Ocean.

263. Religion and Society.
An introduction to the way anthropologists study a variety of religious beliefs and practices. Examine ‘tribal’ religions in terms of the meanings attributed to myths, symbols and other expressions of spirituality; linkages between religious beliefs and social structure; and ritual and healing.

264. Islam and Global Politics.
The response of the Islamic world to European colonialism and American foreign policy.

265. Religion and Culture: Fundamentalism.
The social and cultural circumstances that give rise to religious fundamentalism, explore the reasons for its attraction to adherents, and look at its contrasts with other forms of religious practice.

266. Global Culture.
Discussions of globalization within cultural anthropology and related disciplines. How, why, and with what consequences people and money, ideas and technologies variously move across the planet.

267. Anthropology of Socialism and Post-Socialism.
Socialism (and its aftermath) as a cultural, political, and economic system and how it affected the everyday lives of people in China, Eastern Europe, the former Soviet Union, and elsewhere through a holistic, anthropological approach.

274. Creative Ethnography.
Different styles of writing cultural stories in one of following ways: fiction, poetry, autobiography, creative nonfiction, screenplay, traditional or creative ethnography.

276. Gender and Representation.
An examination of gender-based artistic practices in selected Native American societies.

277. Museum and "the Other."
History and development of ideas about non-Western peoples as presented in North American museums from 1880 to the present.

278. Birth and Death II: Making Populations Healthy.
Programs carried out by governments, multilateral organizations, and non-governmental organizations to deal with “public problems” connected to population: communicable diseases such as TB, malaria and HIV/AIDS; famine prevention and relief; child survival, especially malnutrition and infant diarrheal disease; safe motherhood; teen pregnancy; contraception, and abortion.

299. Malawi Immersion Seminar.
A three-week study abroad/experiential learning program focusing on the health, social, political, and cultural issues in Malawi, Africa.
Archaeology, Technology, and Historical Structures

Steering Committee for Archaeology, Technology, and Historical Structures

Theodore M. Brown, PhD (Princeton)
Professor of History, of Community and Preventive Medicine, and of Medical Humanities

Elizabeth Colantoni, PhD (Michigan)
Assistant Professor of Classics

Th. Emil Homerin, PhD (Chicago)
Professor of Religion

John Lambropoulos, PhD (Harvard)
Professor of Mechanical Engineering and of Materials Science and Senior Scientist in the Laboratory for Laser Energetics; Director, Materials Science Program

Renato Perucchio, PhD (Cornell)
Professor of Mechanical Engineering and of Biomedical Engineering

Allen C. Topolski, MFA (Pennsylvania State)
Associate Professor of Art

This innovative multidisciplinary program studies the establishment and evolution of technological, architectural, and engineering practices and their relationship to the ancient and preindustrial societies and cultures which technology and engineering helped create and sustain. Assuming a global perspective, the program integrates material from several disciplines in engineering and the natural sciences, the humanities, and the social sciences. Students learn to apply engineering, archaeological, architectural, and historical methodologies to explore the creation of artifacts, buildings, and infrastructural systems within and across societies and cultures from the first millennium B.C. to the eighteenth century. A prominent feature of the program is undergraduate research, which may be under the aegis of faculty at the University of Rochester or prestigious foreign academic institutions, to address issues of interpretation, conservation, and restoration of the world’s cultural heritage.

BA in Archaeology, Technology, and Historical Structures

The major consists of a minimum of nine courses (three foundation courses, three core courses, and three electives) and a senior thesis/project (8 credit hours total). A minimum of 44 credit hours is required. The three foundation courses (one each from engineering, archaeology, and architecture) are mandatory and must be completed by the end of the fifth semester. At least two of the three mandatory core courses must be selected from the same core. The remaining three courses may be selected from either the elective courses or the core courses. The senior thesis/project must be decided before the end of the sixth semester. Upon enrollment into the program, students have a regular faculty advisor assigned to help them plan and complete their programs. The choice of advisor is based on students’ interest and will be made in consultation with the program director. Depending on chosen coursework, the major may be classified under any of the College’s three divisions: humanities, social sciences, or engineering/math/natural sciences. Five of the nine courses must be from the same division for the major to satisfy that division. Students satisfy the upper-level writing requirement by writing the senior thesis or an in-depth project report.

Minor in Archaeology, Technology, and Historical Structures

The minor consists of five courses (two foundation courses, two core courses, and one elective) and an independent study or project (4-credit-hour minimum). The two foundation courses consist of either Engineering in Antiquity or The Engineering of Bridges, plus Classical Archaeology or Ancient Architecture. The two core courses need not be selected from the same core. The remaining course may be selected from either the elective courses or the core courses. The independent study or project must be decided before the end of the sixth semester. Depending on chosen coursework, the minor may be classified under any of the College’s three divisions: humanities, social sciences, or engineering/math/natural sciences. Three of the five courses must be from the same division in order for the minor to satisfy that division. Students have a regular faculty advisor assigned to them to plan and supervise the independent study or project.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

FOUNDATION COURSES

ME 104Q. Introduction to Mechanical Design.
Mechanical aspects of design in the context of two areas in which most students have a very good intuitive understanding: structures built and used by humankind over the centuries, and human and animal bodies. We examine how Newtonian Mechanics, material behavior, energy requirements, size and dimensional considerations define the boundaries of mechanical design in nature and in human technology. On the side of technology, the course studies the evolution of masonry buildings, of bridges, and of other structures. In the case of biological design, topics include bones and the skeletal system, the heart and the circulatory system, muscles and soft tissues. Students work in teams on several design projects, including written reports, model constructions, poster presentation.

ME 106. Engineering in Antiquity.
Prerequisite: none.
Application of engineering principles and technology to the design and performance of engineering structures from antiquity to the pre-industrial world. Engineering principles (transfer of forces, momentum, and energy), study of primary texts (in
translating), and examination of existing structures/monuments. Primary texts include selections from Aristotle’s Mechanical Problems, Vitruvius’ Ten Books on Architecture, Leonardo’s Notebooks, Galileo’s Dialogues on Two New Sciences. Emphasis on engineering design of engineered structures from the Bronze Age to the 18th century. Topics: Evolution of engineered materials (metals, wood, stone, marble, concrete, composites) and limitations; Bronze Age fortifications; Structural design of Greek temples; Roman aqueducts, siphons, and vaults; Force, power and energy sources and transmission; Failure of materials; Lifting devices; Construction engineering; Columns, beams, vaults, trusses, frames; Instruments of warfare. Open to all undergraduates.

This offering introduces architecture of the ancient world with a focus on Egypt, Mesopotamia, the Bronze Age Aegean, Greece and Rome. Of particular interest is the creation and development of urbanism in which spaces and buildings are expressions of political, social, economic and religious aspects of the cultures. Due consideration will be made of the environment as a source not only of materials (and their construction techniques), but also relating to the meaning of buildings and the world view of the cultures.

The architecture of Greece and Rome is fundamental to our understanding of the heritage of the West. We will trace the origin and development of building types in Greece: the temple and its sacred area, buildings of public cultural use such as theaters and the invention of town planning. The development of Roman architecture will also be examined for its sources and meaning, considering local Italic traditions, Etruscan and Greek. In addition to determining the meaning of architectural forms, two major themes will be followed: the spatial aspect of planning and building and the inventiveness of Roman constructional practices.

This course examines the physical remains of ancient Greek civilization, with an emphasis on architecture, sculpture, painting, and other visual arts, in order to understand Greek culture and society.

CLA 221. Classical Architecture: Roman Art and Architecture.
An examination of the physical remains of ancient Roman civilization, with an emphasis on architecture, sculpture, painting, and other visual arts, in order to understand Roman culture and society.

CORE COURSES

ME 104Q. Introduction to Mechanical Design.
Mechanical aspects of design in the context of two areas in which most students have a very good intuitive understanding: structures built and used by humankind over the centuries, and human and animal bodies. We examine how Newtonian Mechanics, material behavior, energy requirements, size and dimensional considerations define the boundaries of mechanical design in nature and in human technology. On the side of technology, the course studies the evolution of masonry buildings, of bridges, and of other structures. In the case of biological design, topics include bones and the skeletal system, the heart and the circulatory system, muscles and soft tissues. Students work in teams on several design projects, including written reports, model constructions, poster presentation.

ME 106. Engineering in Antiquity.
Prerequisites: none.
Application of engineering principles and technology to the design and performance of engineering structures from antiquity to the pre-industrial world. Engineering principles (transfer of forces, momentum, and energy), study of primary texts (in translation), and examination of existing structures/monuments. Primary texts include selections from Aristotle’s Mechanical Problems, Vitruvius’ Ten Books on Architecture, Leonardo’s Notebooks, Galileo’s Dialogues on Two New Sciences. Emphasis on engineering design of engineered structures from the Bronze Age to the 18th century. Topics: Evolution of engineered materials (metals, wood, stone, marble, concrete, composites) and limitations; Bronze Age fortifications; Structural design of Greek temples; Roman aqueducts, siphons, and vaults; Force, power and energy sources and transmission; Failure of materials; Lifting devices; Construction engineering; Columns, beams, vaults, trusses, frames; Instruments of warfare. Open to all undergraduates.

ME 206. Building Engineering and Technology in Antiquity.
Engineering and technological problems involved in the design, construction, maintenance, and collapse of major buildings and infrastructural systems from antiquity to the pre-industrial world drawing material from case studies of relevant monuments primarily from Classical Rome and Greece, and the Middle Ages.

ME 107. Mechanics and Optics in Antiquities.
Prerequisite: none.
The basic principles of mechanics and optics as they developed in ancient Greece, Rome, China and Europe and the emergence of mechanics and optics prior to the industrial revolution. Examples: Law of the lever (Aristotle and Archimedes); Center of gravity (Archimedes and Galileo); Gears, metalworking, and the Antikythera mechanism; Hellenistic science; Medieval mechanics and optics; Mechanical designs of Leonardo da Vinci; Development of glass-making, eyeglasses, the telescope (Galileo, Kepler, Newton); Lens grinding and polishing; Dynamics and strength of materials (Galileo); The emergence of mechanics (Newton) and optics (Kepler). The course includes basic mechanics and optics; study of texts (in English translation); and study of artifacts and archaeological and historical discoveries. Open to all undergraduates.
CLA 204. Engineering and Society in Antiquity.
This course explores the relationship between, on the one hand, engineering and technological advances and, on the other hand, social practices in ancient Greece and Rome.

ME 207. Roman Structures: Building the Imperial City.
This course examines the engineering and technology in Roman Imperial times as related to building design, construction, and maintenance of large-scale projects in the city of Rome. The course begins with a mandatory study-on-location component in Italy in the summer. Topics include forces, materials, and structural design. ME 106, Engineering in Antiquity, is recommended but not required. The course is appropriate for students in the humanities and the social sciences as well as in engineering. Coursework includes homework assignments, midterm exam, and term project. Additional program fee for the study-on-location in Italy is required.

AH 106. Introduction to Archaeology.
This course introduces the student to the field of archaeology through three units of study: 1) The history of excavation from ancient to modern times, 2) The techniques of excavation and the analysis of material remains, 3) Modern theories of cultural interpretation of archaeological sites. We will discuss the value of archaeological approaches to the fields of anthropology, history, architectural and art history, religious and classical studies. Much of the instruction will be illustrated by case studies of sites; although the view will be global, there will be a concentration in Old World material from prehistory to the early modern period. Students will be required to write three essays, with subjects selected from each of the three course units.

This course examines the physical remains of ancient Greek civilization, with an emphasis on architecture, sculpture, painting, and other visual arts, in order to understand Greek culture and society.

CLA 221. Classical Architecture: Roman Art and Architecture.
An examination of the physical remains of ancient Roman civilization, with an emphasis on architecture, sculpture, painting, and other visual arts, in order to understand Roman culture and society.

HIS 269. Archaeology of Early America.
This course introduces students to historical archaeology and uses archaeological sites, material culture, and architecture to investigate European colonization of the Americas. Topics include Euro-Indian contact, the transfer of European and African cultures to American shores, creolization and the emergence of distinctly American traditions, Atlantic connections, and how non-documentary sources help us understand the lives of African-Americans, Indians, and white settlers.

This offering introduces architecture of the ancient world with a focus on Egypt, Mesopotamia, the Bronze Age Aegean, Greece and Rome. Of particular interest is the creation and development of urbanism in which spaces and buildings are expressions of political, social, economic and religious aspects of the cultures. Due consideration will be made of the environment as a source not only of materials (and their construction techniques), but also relating to the meaning of buildings and the world view of the cultures.

The architecture of Greece and Rome is fundamental to our understanding of the heritage of the West. We will trace the origin and development of building types in Greece: the temple and its sacred area, buildings of public cultural use such as theaters and the invention of town planning. The development of Roman architecture will also be examined for its sources and meaning, considering local Italic traditions, Etruscan and Greek. In addition to determining the meaning of architectural forms, two major themes will be followed: the spatial aspect of planning and building and the inventiveness of Roman constructional practices.

Architecture gives form to space. It is a specialized, functional art that defines space for a utilitarian purpose, based on a specific set of conditions. Architecture makes music out of notes, poetry out of words, it elicits a response. This course will explore the fundamental design principles that are the tools used to create architecture. Through a series of talks, images, field trips, and creative exercises, the students will gain a new awareness of a building, an outdoor space or an entire city. The students will become more sensitive to both the natural and built environment through this increased understanding of architecture. This course is intended to be very interactive and therefore enrollment will be limited to 10 students. Students will be evaluated on two papers and a final project. This course is open to all majors, and prior architecture study is not required.

AH 150. Introduction to Architecture.
The lectures and readings of this course introduce many approaches to the study of architecture. We will explore the meaning of building in its cultural and environmental context and will consider the specifics of aesthetics, materials, and structure, using a selection of works from prehistoric to modern times. Emphasis will be placed on experiencing architecture through real, reconstructed and imaginary buildings.

AH 245. Architecture in the High Middle Ages.
This course introduces the architecture of Western Europe from the eleventh to the fifteenth century. Building of this era is usually divided into two principal phases, Romanesque and Gothic. While there are numerous regional and chronological variations during these centuries, many instances of exchange across Europe and exotic
influences through cross cultural contact, the course stresses the pan-European development of structural and aesthetic inventiveness and the extraordinary relation between form and content in buildings, whether churches, monastic communities, houses or castles. All of the works are examined against the changing values of cultures, which constitute the transformation of the West.

CLA 214. The Ancient City.
Urbanism in the ancient Mediterranean world. Survey of the rise of cities in the Near East and Egypt and detailed study of the cities and colonies of ancient Greece and the Roman Empire, using the evidence of archaeological remains.

CLA 299. Field Methods in Archaeology.
In this course, taught on site at an archaeological excavation, students receive instruction and hands-on training in archaeological field and laboratory work, including remote sensing in archaeology, on-site surveying, excavation techniques, field documentation, and artifact identification and processing.

IT 223. Monuments of Ancient Italy: History, Structure, Form.
The course studies the archaeology and architecture of buildings in ancient Italy from the fifth century BC to the fourth century AD, adopting a multidisciplinary approach based on archeological evidence, technical and functional aspects, and historical significance. Classes are taught on location and focus on the most relevant monuments and archeological sites in central and southern Italy, including Rome, Ostia Antica, Pompeii, Herculanenum, Baia, and Paestum. The course is divided into three parts: (1) structural design and technical issues related to ancient monuments, (2) monuments of Etruscan Italy and Magna Grecia, and (3) Roman monuments.

CLA 102. Cultural History of Ancient Greece.
Survey the military, political, and social history of ancient Greece from the Bronze Age to the death of Alexander.

CLA 115. Roman World.
This course offers a comprehensive account of the history of Rome.

This course explores: theories about the roles of race, language, and culture in the construction of identity; the relative usefulness of historical and archaeological methodologies in attempts to understand past conceptions of identity; ethnic identity and the ethnic groups of the ancient Greek and Roman worlds as presented by specific ancient texts and archaeological remains; and the ways in which modern and contemporary ethnic issues have influenced the study of classical antiquity.

PHL 201. History of Ancient Philosophy.
Survey of the origins of Western philosophy, from the Presocratics through Hellenistic philosophy six centuries later. The great philosophers of the Classical period, Socrates, Plato, Aristotle, are studied in detail.

HIS 100. Gateway to History.
An introduction to historical research and inquiry for prospective and new history majors. Each section of this course will be organized around a particular theme - please see term description for details.

HIS 101. The Ancient World.
The course introduces European history by examining the civilizations of the ancient world: the cultures of Egypt, Mesopotamia, Greece and Rome. We will study multiple aspects of these cultures with a focus on the emergence of the city and its social, political and economic makeup, as seen through a variety of sources from texts and material culture. Students will become aware of the dimension of historiography; that is, how we have come to interpret these peoples today.

HIS 103. The West and the World since 1492.
This course focuses on encounters between Europeans and people of other cultures from 1492 to the 1970s, on the development of the ideals of individual rights and popular sovereignty in Europe, and on the spread of the industrialized nation-state as an organizational model for societies throughout the world. Episodes and topics we may cover include the Spanish conquest of Mexico, English Civil Wars of the 17th century, the French Revolution and human rights, Japanese response to Western imperialism, and stalinism.

AH 244. Art, Architecture, and Literature in the Age of Dante and Beyond (Arezzo, Italy).
When we look at works of art in museums, galleries, and churches, we are, in most cases, looking at them out of context. Furthermore, when we look at early Renaissance paintings, we do not see them through the eyes of the people who produced them or for whom they were produced. We have to learn to see them as they might have been seen. We can begin to do this by learning how to read and to interpret the complex elements at play beneath the immediate surface by setting the artist, his work, and his public in their social and religious historical contexts, and by exploring the universal unspoken language of signs and symbols used by artists. The course content is based on painted forms, i.e., panels, canvases, and frescos from the Trecento and Quattrocento with an emphasis on Tuscan painting. The selection, as far as possible, takes advantage of the availability of works in churches, museums, and galleries within easy visiting distance of Arezzo.

HIS 111. History of Technology.
This course surveys the history of technology and its impacts on agriculture, communication, transportation, housing, health, war and society. The Romans used technology to build an empire, as did Venice, Great Britain, America, and the Soviet Union, but each also discovered the limits of technology. In addition to examination of inventors and inventions, the role of government and society in technological innovation will be examined.
MTH 300W. History of Mathematics I.
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.

HIS 207. Intellectual History of Science.
A study of intellectual continuity and change in science focused on “revolutionary” episodes from the sixteenth to the twentieth century. After a close look at Thomas S. Kuhn’s still-relevant The Structure Of Scientific Revolutions, the course will direct attention to several often-acknowledged revolutions: Copernicus’ in sixteenth century astronomy; Newton’s in seventeenth and eighteenth century physics; Darwin’s in nineteenth century biology; quantum mechanics and Einsteinian relativity in the early twentieth century; and Freud’s revolutionary discovery of the unconscious. Only an intelligent layman’s knowledge of science is required.

ELECTIVE COURSES

ME 110. Introduction to Cad and Drawing.
This course covers engineering drawing, and modeling using the Computer Aided Design software Pro/ENGINEER. Topics include orthographic projections, solid modeling, assemblies, and dimensioning. Students will complete the course with a fundamental ability to create and understand solid modeling, and engineering drawings using state of the art PC CAD software. Lectures will make use of a computer projection screen as well as 30 individual computers.

ME 120. Engineering Mechanics I.
Basic concepts; units; vector algebra; forces; moments; force systems; equilibrium. Plane trusses; method of joints; method of sections; space trusses; frames and machines. Centroids of lines, areas, and volumes; center of mass. Distributed loads on beams; internal forces in beams; distributed loads on cables; hydrostatics. Basic concepts of friction; dry friction; friction in machines.

ME 121. Engineering Mechanics II.
This course uses an engineering approach to the solution of dynamics problems with an emphasis on conceptual understanding. Topics include kinematics and kinetics of particles and rigid bodies.

ME 226. Introduction to Solid Mechanics.

ME 225. Introduction to Fluid Dynamics.
Fluid properties; fluid statics; kinematics of moving fluids; the Bernoulli equation and applications; control volume analysis; differential analysis of fluid flow; inviscid flow, plane potential flow; viscous flow, the Navier-Stokes equation; dimensional analysis, similarity; empirical analysis of pipe flows; flow over immersed bodies, boundary layers, lift and drag.

ME 204. Mechanical Design.
The theory and application of structural mechanics to mechanical design. Topics include: matrix structural analysis and finite element techniques. Students will 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.

ME 222. Introduction to Robust Design and Quality Engineering.
Definition and pursuit of “quality” as a design criterion. The concept of robust design. Selection of the quality characteristic, incorporation of noise, and experimental design to improve robustness. Analysis and interpretation of results.

ME 254. Finite Elements.
This course provides a thorough grounding on the theory and application of linear finite element analysis in solid mechanics and related disciplines. Topics: structural matrix analysis concepts and computational procedures; shape functions and element formulation methods for 1D, 2D problems; variational methods, weighted residual methods and Galerkin techniques; isoparametric elements; error estimation and convergence; global analysis aspects. Term project and homework require computer implementation of 1D and 2D finite element procedures using MATLAB. Term project not required for ME254.

AH 137. Introduction to Modern Architecture.
Topics include major figures such as Richardson, Sullivan, Voysey, Wright, Corbusier, or Mies van der Rohe, and topics such as the architectural development of structural metal, Art Nouveau, urban spaces, or the Bauhaus.

AH 256. Vernacular Architecture in USA.
This class provides an in-depth exploration of American vernacular architecture. Scholars and architectural professionals apply the term “vernacular architecture” to traditional domestic and agricultural buildings, industrial and commercial structures, 20th century suburban houses, settlement patterns and cultural landscapes; in other words to “ordinary” or “everyday” spaces and places that people encounter daily but rarely think about critically. By looking at the work of scholars from the fields of anthropology, history, American studies, cultural geography, landscape architecture and history, folklore, and material culture we will investigate how these ordinary environments can help us to understand the culture of ordinary people. In particular, we will explore how “cultural landscapes” are created and how they construct frameworks that help
us understand the significance that vernacular environments have had for their makers and users.

**AH 274. Cultural History of American Architecture.**
Focuses on what the critic Andreas Huyssen calls the perceived “Great Divide” between highbrow and lowbrow forms of culture. Explores the emergence of these divisions and interrogates if and how they have blurred in the recent past.

**AH 284. Modern Architecture and Urbanism.**
The architecture of Los Angeles will serve two different purposes in this seminar. On the one hand, we will study the whole range of modern architecture—from mission style (Gill), arts and crafts (Greene and Greene), and the early modernists (Wright, Schindler), to high modernism (Neutra, the Case Study houses), and postmodernism (Gehry)—as a singular regional, but nevertheless representative development of modern architecture. On the other hand, using architecture as a starting point, we will look at the strange utopia/dystopia of Los Angeles as an example of a new kind of urbanism and style of living. Our texts will include not only studies of architecture, but also Hollywood films (Chinatown, Bladerunner), detective novels (Raymond Chandler), new journalism (Joan Didion), and urban theory (Reynier Bahnam, Mike Davis).

**AH 320. Politics of Space.**
*Prerequisite: permission of instructor.*
In this class we will explore how space is constructed and politicized. From the 19th century flaneur to 21st century cyber communities, from the global economy to domestic interiors, space has been and continues to be ideologically contested terrain. Together we will explore these contests. We will pay close attention to questions of identity formation, particularly as they relate to issues of gender, race and class. In addition, we will investigate the importance of technology in transforming the ways in which we think about space.

**IT 244. Art, Architecture, and Literature in the Age of Dante and Beyond (Arezzo, Italy).**
When we look at works of art in museums, galleries, and churches, we are, in most cases, looking at them out of context. Furthermore, when we look at early Renaissance paintings, we do not see them through the eyes of the people who produced them or for whom they were produced. We have to learn to see them as they might have been seen. We can begin to do this by learning how to read and to interpret the complex elements at play beneath the immediate surface by setting the artist, his work, and his public in their social and religious historical contexts, and by exploring the universal unspoken language of signs and symbols used by artists. The course content is based on painted forms, i.e., panels, canvases, and frescos from the Trecento and Quattrocento with an emphasis on Tuscan painting. The selection, as far as possible, takes advantage of the availability of works in churches, museums, and galleries within easy visiting distance of Arezzo.

**SA 131. Introductory 3D.**
A wide range of materials and techniques from metal and welding to assemblage, from wood to experimental methods and media is explored in the service of three dimensional art making. Investigations of the specific qualities of three dimensional media (i.e. space, form, scale, mass) and how they can convey ideas are made within a contemporary framework. Artworks synthesize a particular choice and use of materials and a concept or expression. It is the aim of this class to develop this synthesis, and in so doing, begin to develop the students’ own working creative vocabulary. Not open to seniors.

**SA 232. Advanced 3D.**
*Prerequisite: permission of instructor.*
This class broadens the investigation undertaken in Introductory 3D to include other materials and processes as well as a focus on working in an interdisciplinary fashion. This course furthers the development of the student’s three dimensional form vocabulary and their options for articulating their ideas. The ability to verbally and visually articulate ideas is developed through group discussion and critique.

**SA 233. Issues in Advanced 3D.**
*Prerequisite: permission of instructor.*
Students incorporate a variety of media in works that expand the physical boundaries of art beyond the discreet object. Students’ interests and abilities in a variety of subjects and media are used to create environments that immerse the viewer in sensory, intellectual and emotional experiences. The ability to verbally and visually articulate ideas is developed through group discussion and critique.

**EES 119. Energy and Society.**
National and worldwide patterns of production and consumption of renewable and non-renewable energy sources and the connection of those patterns to socioeconomic conditions. For each resource, we consider the environmental effects of extraction, distribution, and consumption; how efficiently the resource is used and for what end uses; current reserves and projections for the future; socioeconomic and political factors affecting the resource’s utilization; and international trade patterns and energy security. The course concludes with an overview of emerging energy technologies.

**EES 204. Mineralogy.**
Lectures discuss the physical and chemical principles governing the properties and formation of minerals. There are three major divisions of the subject matter: (a) geometric and optical crystallography; (b) crystal chemistry and properties of minerals, and (c) occurrence, origins, and pressure-temperature properties of the major rock-forming minerals. Laboratories are devoted to exercises in crystallography, X-ray diffraction, optical mineralogy and hand-specimen mineral identification.
**EES 211. Geohazards and Their Mitigation: Living on an Active Planet.**

Earthquakes and volcanic eruptions are violent manifestations of plate tectonics, the movement of the relatively rigid plates forming the Earth’s outer shell. Ground movements and shaking from these events may generate tsunamis, slumping and mass wasting, and increase risk in other areas. Global and regional sealevel rise changes forces on the plates, motivating reconsideration of hazard assessments. Large volumes of aerosols and greenhouse gases are emitted during the volcanic eruptions, with implications for global climate change. The first third of the class focuses on the causative mechanisms of earthquakes, volcanoes, tsunamis, volcanic-eruption induced climate change. The second third outlines the consequent hazards and forecasting efforts, and feedbacks between these processes. The final third of the course examines mitigation programs, with numerous case studies.

**CHE 277. Energy Resources and Utilization.**

Emphasis on technical and development aspects of energy resource problems. Applications of resource exploration and development in energy prospective locales which lack commercial energy development: such as the rift basins and embayments of Africa. Consideration of quality of life impacts of energy. Problems considered include: combustion of fossil fuels for heat and work, combustion products and environmental impact, comparison of fuels on environmental grounds, benefits of energy in social development, technology of energy exploration and development, and economics of energy development and acquisition.

**LAT 101. Elementary Latin I.**

Come learn the language of Vergil, Cicero, and St. Augustine. Latin has been the western world’s learned language for 2000 years and is the source for most of the scholarly and technical vocabulary of English. The elementary Latin sequence (LAT 101, 102, 103) is designed to get you reading authentic materials quickly. No Latin background is required or assumed.

**LAT 102. Elementary Latin II.**

This course completes Latin 101’s introduction to Latin grammar and introduces the reading of continuous Latin prose.

**LAT 103. Intermediate Latin.**

This course, the third in the introductory sequence, consists of readings from a selection of Latin prose and poetry with accompanying grammar review.

**LAT 216. Roman Historians.**

Selections from major Roman historians are read and discussed.


An introduction to Greek designed to prepare students to read the Classical Greek dramatists, philosophers, orators, and historians, and the New Testament.

**CGR 102. New Testament and Classical Greek II.**

A continuation of CGR 101.

**CGR 103. Intermediate Greek I.**

Review of Greek grammar and readings in an unadapted prose text.

**CLA 135. Classical Mythology.**

Introduction to the major myths of the classical gods and heroes using readings in translation and visual images.

**CLA 142. The Ideas of the Greeks.**

A study of the major literary, philosophical, religious, and historical themes, and ideas from Homer to Aristotle.

**CLA 209. Ancient Roman Religion.**

This course explores the religion of the ancient Romans from the time of the founding of the city of Rome in the eighth century BC to the end of the Roman imperial period in the fifth century AD.
Art and Art History

Professor Emeritus

Janet Catherine Berlo, PhD (Yale)
Professor of Art History and of Visual and Cultural Studies

Douglas Crimp, PhD (CUNY)
Fanny Knapp Allen Professor of Art History and Professor of Visual and Cultural Studies

Paul Duro, PhD (Essex, England)
Professor of Art History and of Visual and Cultural Studies

David A. Walsh, PhD (Minnesota)
Professor of Art History and of History

Sharon Willis, PhD (Cornell)
Professor of Art History and of Visual and Cultural Studies

Professor

Elizabeth Cohen, MFA (Rhode Island School of Design)
Associate Professor of Art

Rachel Haidu, PhD (Columbia)
Associate Professor of Art History and of Visual and Cultural Studies

A. Joan Saab, PhD (NYU)
Associate Professor of Art History and of Visual and Cultural Studies

Grace Seiberling, PhD (Yale)
Associate Professor of Art History

Marni B. Shindelman, MFA (University of Florida)
Associate Professor of Art History

Allen C. Topolski, MFA (Pennsylvania State)
Associate Professor of Art History

Associate Professor Emeritus

Carl Chiarenza, PhD (Harvard)
Fanny Knapp Allen Professor Emeritus of Art History

Archibald Miller, MFA (Cranbrook Academy)
Professor Emeritus of Art

Michael Venezia, MFA (Michigan)
Professor Emeritus of Art

The Department of Art and Art History offers a wide variety of courses, programs and degrees in art history, studio art, and visual studies. As a department teaching both theory and practice, art and art history provides interdisciplinary explorations of historical and conceptual frameworks using a wide range of interpretive techniques and media. Studio students may take courses in painting, printmaking, sculpture, photography, and video. Art history and visual studies students pursue courses in history and theory in all of the visual media. Undergraduate majors, minors, and concentrations in art history, visual studies, and studio arts are offered. Students may undertake internships in Rochester's diverse and rich cultural institutions. The department also offers the unique “Art New York” residential program in New York City.

Art History and Visual Studies

Art history/visual culture is a field of study in which the information and methodologies of many fields come together. The discipline of art history/visual culture involves the analysis of the work of art itself—understanding its form, and why and how we make use of it. It is also the 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 exchange, reception, conservation, and restoration. Art historical studies draw upon adjacent areas of study such as cultural and intellectual history, psychology, literary criticism, religion, philosophy, sociology, archaeology, and the history of science. The history of art/visual culture is an ideal field for students who wish to acquire a general cultural background, to develop analytical and writing skills, and to sharpen critical sensibilities.

BA in Art History

For those who wish to major in art history, the department offers a variety of approaches, structured around each student's individual interests and career plans. Students construct their studies with the aid and direction of the program advisor and typically follow one of three areas of concentration:

- Studio Theory and Practice
- Histories and Theories of Art
- Visual and Cultural Studies

These areas respond to the various ways students wish to explore art and visual culture, and provide flexible guidelines that allow students to combine courses from different departments into an individualized major within the Department of Art and Art History.

A total of 12 courses fulfill the requirements for a student majoring in art history/visual culture:

- Two or three 300-level introductory art history courses
- Four 200/400-level art history courses in a relationship determined in discussion with the program advisor. Independent Study in Art History and Internships can meet some of these requirements.
- One or two studio art courses
- One section of Writing on Art (offered once a year) in advance of the senior year
- One section of Senior Seminar in the senior year
- One additional course in the department

Study abroad during a fall or spring semester in the University's European Arts Internship program is encouraged for

Studio Arts

The Studio Arts Program of the Department of Art and Art History focuses on the production aspects of visual studies. At Sage Art Center, art is produced, analyzed, and exhibited; it provides access to all the materials, supportive resources, and faculty and staff necessary for a rich studio experience. The program focuses on contemporary approaches to art production; it strives to produce technically adept students with an understanding of art's place in culture. The program of study invites, accommodates, and engages individuals with little or no previous art experience. At the same time that it administers to those with marginal interests, it also provides a rich environment for thoroughly intensive study.
majors and nonmajors alike. In Europe, 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. In addition, the department offers an Art New York semester, which includes an internship and coursework as well as intensive exposure to art history/visual culture and contemporary art-making in New York City’s museums, galleries, studios, and cultural institutions.

Requirements

Honors in Art History
Students wishing to be considered candidates for honors in art history/visual culture must meet the following requirements before applying:

- Have a grade point average of 3.3 within the major.
- Have completed the introductory courses and at least three courses in the students’ program, or have demonstrated proficiency in a number of related courses in the field.
- Have completed a 300-level 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 students and their chosen faculty advisors early in the junior year.

Following acceptance of the proposal by the department, the candidates must complete the requirements listed below:

- A minimum of 12 credit hours beyond major requirements: 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) that 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 35 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 students' project advisor, a second reader, selected together by the advisor and the students, 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 minor consists of five courses, three of which should be interrelated; these may be courses in a historical sequence, deal with a single period or medium, or address theoretical issues:

- Two or three 100-level courses
- Two or three 200/400-level courses

Requirements for Independent Study in Art History

- Topic for research must not be available within the regular offerings of the department. Schedule conflicts are not a rationale for independent study.
- Faculty director must have relevant expertise in topic area and be willing to supervise the students 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.

BA in Studio Art
A major in studio art must be declared prior to the junior year and requires a total of 12 courses, including two from a related area:

- Four 100-level studio art courses (prior to the junior year).
- No more than two transferred studio courses will be accepted toward a major.
- Three 200/300-level studio art courses
- One section of Writing on Art (offered once a year) in advance of the junior year
- Two semesters of Senior Studio and Seminar (taken in the final two semesters, the second of which should not be taken concurrently with any other 200/300-level studio).
- Two other courses from related areas. Although these two courses are typically in art history/visual culture, one being from offerings in critical theory, relevant courses in film and media studies will also be accepted.

Students are encouraged to meet with a faculty advisor to design a coherent program of study early in their degree process. Majors should consider courses alternative to the regular 200/300-level offerings; internships, both local and through the Art New York program, as well as courses such as Supervised Teaching and study abroad are encouraged and available. The major is required to have an exhibition, installation, or screening of work in the final semester of the senior year; documentation of the work must be submitted and the students must be prepared to discuss the work in depth in a final review with the studio art faculty.

Honors in Studio Art

Requirements
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 major.
- Completion of the established minimum distribution requirement for the major.

To apply, submit to the department an honors project proposal, the subject of which has been mutually agreed upon (signed) by the students and their chosen faculty advisor early in the junior year.
Following the acceptance of the proposal by the department, candidates must fulfill the following requirements:

- A minimum of 12 credit hours beyond major 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 students’ 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 8 to 15 pages soundly substantiating the students’ 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.

**Minor in Studio Art**

A minor in studio art requires five production-based courses:

- Two or three 100-level studio art courses
- Two or three 200/300-level studio art courses

**Requirements for Independent Study in Studio Art**

- Topic for exploration 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 students and to sign a contract stipulating agreed-upon requirements.
- Normally open only to juniors and seniors who have previously completed a sufficient number of studio courses.
- Semester must result in a body of individual studio work or equivalent project at an advanced level of achievement.
  - Course schedule conflicts are not accepted as a rationale for independent studies.

**Requirements for Degree with Distinction**

Grade point average is calculated only from the required major courses. Transfer grades and study 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

**Upper-Level Writing Requirement**

Upper-level writing requirements for the department are available in the department office or by contacting one of the department undergraduate advisors.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**INTRODUCTORY COURSES**

**Art History (AH)**

**100. Introduction to Visual and Cultural Studies.**

The aim of this course is two-fold: First, to develop an understanding of the extraordinary variety of ways meaning is produced in visual culture; secondly, to enable students to analyze and describe the social, political and cultural effects of these meanings. By studying examples drawn from contemporary art, film, television, digital culture, and advertising we will learn techniques of analysis developed in response to specific media and also how to cross-pollinate techniques of analysis in order to gain greater understanding of the complexity of our visual world. Grades are based on response papers, class attendance and participation, and a midterm and a final paper. Occasional film screenings will be scheduled as necessary in the course of the semester.

**101. Introduction to Art History.**

This course is designed to introduce the student to aspects of the history of Western painting, sculpture, & architecture from the Renaissance through the present. We will examine the various schools & movements in their historical contexts, while paying particular attention to the histories that bear upon them, such as the influence of the classical past, religion, gender, political power, & the rise of the artist. The course will therefore attempt two goals; one, to familiarize students with the principal monuments of the western tradition from about 1400 onward, that is, the paintings, sculptures, buildings, & artifacts which form the substance of this narrative; two, to develop visual literacy, that is, the ability not only to identify but also to discuss art works in a way that develops critical competence & an understanding of how the western tradition of art has come about.

**102. Introduction to Media Studies.**

Considers the cultural and economic histories of the mass media, with television produced in the United States as the primary focus with close consideration to questions of race, gender, and cultural identity in U.S. media culture.

**107. Ancient Architecture.**

This offering introduces architecture of the ancient world with a focus on Egypt, Mesopotamia, the Bronze Age Aegean, Greece and Rome. Of particular interest is the creation and development of urbanism in which spaces and buildings are expressions of political, social, economic and religious aspects of the cultures. Due consideration will be made of the environment as a source not only of materials (and their construction techniques), but also relating to the meaning of buildings and the world view of the cultures.
128. Modern Art.
This course introduces students to art made from the late 19th century to the present day. Broad coverage of a long time span will be supplemented with a consideration of selected “key” works to familiarize students with points of reference and to introduce concepts. Readings will introduce ideas from contemporary theory. Issues of gender, the effects on art of technology, and the way in which institutions have influenced the production and reception of modern art will be considered. The course will be taught by a combination of lecture and discussion.

130. History of Photography.
This survey course will provide an overview of photography from pre-photographic times to the present. Given that there is no single history, but only histories of the medium, the course will explore a variety of approaches to the study of photography, its evolution in relation to other art forms and its role in the development of mass culture. Students taking this course will gain a basic knowledge of photographic history, its major events, practitioners and theorists. We will consider the photographic image in a range of contexts, including art, advertising, journalism and propaganda, and will explore the social, political and ethical consequences of photographic media in our culture. This course will make extensive use of the collections of the International Museum of Film and Photography at the George Eastman House.

136. 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.

137. Introduction to Modern Architecture.
Topics include major figures such as Richardson, Sullivan, Voysey, Wright, Corbusier, or Mies van der Rohe, and topics such as the architectural development of structural metal, Art Nouveau, urban spaces, or the Bauhaus.

PROGRAM COURSES

209. Writing on Art.
Prerequisite: permission of instructor.
This course seeks to improve students’ writing and analytical skills through analysis and experimentation with different styles of writing about contemporary and historical arts. Students analyze prose by artists, historians, cultural critics, poets, and others who have written on the visual arts, with an eye towards how writing on art can be a tool for improving expression in many areas. Slide lectures, discussions, and writing projects on objects of diverse media and historical eras will be augmented by visiting speakers and field trips to museums and galleries. This course fulfills one-half of the upper level writing requirement for both studio and art history majors.

Feminist art historians have changed the way we think about images of women, works by women artists, and the very notion of artistic genius. This course will investigate the way in which visual images of women participate with other cultural and social factors in the construction of the idea of woman. It will look at types and conventions in works by male and female artists, as well as in anonymous prints and advertising from different periods, with a concentration on the 19th and 20th centuries. Readings will introduce a variety of approaches.

214. Beyond the Boundaries: Folk and Outsider Art.
Road-side signs, weathervanes, quilts, nut crackers in the shape of a woman’s body—what do vernacular and popular objects from the 19th century to the present tell us about American culture? These problematized classes of objects are sometimes called craft, folk art, outsider art, or vernacular art. We will chart the history of thought about these rubrics, from late 19th century European writings on craft and ornament to early 20th century American writings on folk art, to the contemporary fascination with “outsider” art. In some semesters, this course may focus on specialized topics, such as “folk erotica” or vernacular environments. May be taken more than once for credit with permission of instructor.

The Seminar in Contemporary Art is a course designed to bring together studio art and art history majors and minors in an extended discussion of contemporary artistic practices. We often look backwards to the 1960s or earlier but usually focus on a method, issue, or aspect to contemporary art (e.g. participation; photography; authorship). This course prepares students for critical engagement with contemporary art practices and can serve as an excellent preparation for Art New York or for a career in the arts.

Explores the cultures of northern Europe from the fifth century B.C.E. to the tenth century C.E.

243. Architecture in the Class World.
The architecture of Greece and Rome is fundamental to our understanding of the heritage of the West. We will trace the origin and development of building types in Greece: the temple and its sacred area, buildings of public cultural use such as theaters and the invention of town planning. The development of Roman architecture will also be examined for its sources and meaning, considering local Italic traditions, Etruscan and Greek. In addition to determining the meaning of architectural forms, two major themes will be followed: the spatial aspect of planning and building and the inventiveness of Roman constructional practices.
245. Architecture in the High Middle Ages.

This course introduces the architecture of Western Europe from the eleventh to the fifteenth century. Building of this era is usually divided into two principal phases, Romanesque and Gothic. While there are numerous regional and chronological variations during these centuries, many instances of exchange across Europe and exotic influences through cross cultural contact, the course stresses the pan-European development of structural and aesthetic inventiveness and the extraordinary relation between form and content in buildings, whether churches, monastic communities, houses or castles. All of the works are examined against the changing values of cultures, which constitute the transformation of the West.

250. Age of Baroque.

This course will address the painting, sculpture and architecture of seventeenth-century Europe. The art examined will range from Italian ecclesiastical architecture through to the art of Louis XIV's Versailles, Spanish court art and the art of the Dutch Republic. Artists studied will include Poussin, Rembrandt, Bernini, Borromini, Caravaggio, van Dyck, Velasquez, Rubens, and Vermeer. While there is no one methodology that adequately explains this varied and exuberant period, we will focus on the development of a Baroque way of seeing the better to understand the stylistic break between the Renaissance and the Baroque on the one hand, and the Baroque’s relationship to the Rococo on the other. The course will be structured around lectures, but every class will include time for a group discussion. Several classes will be held at the Memorial Art Gallery, utilizing MAGs rich holdings of Baroque painting. Readings will be available via the library’s web page and linked to weekly discussions.

255. Arts in American Culture.

What did it mean to be American? What did America look like, geographically and in terms of its people? What part did art and photography play in documenting and giving an identity to Americans in the century between 1850 and 1950? Attention will be given to documenting and representing the West, immigration, and the emerging urban environment. Students will work with the collections of George Eastman House and the Memorial Art Gallery. Requirements for the course include a short museum paper, a term paper, and take-home midterm and final exams.

259. Women, Cloth, and Culture.

Why is it that throughout history and across different cultures, women are often associated with “soft goods” (cloth) rather than “hard goods” (sculpture)? We will focus on case studies that analyze women’s varied roles in the production and use of cloth, from indigenous societies of Africa and the Americas, to colonial encounters in those regions, to modern artistry and the structures of globalized industry. Topics may include: raffia cloth made by royal women in Central Africa, textiles of Maya weavers of Guatemala, 19th-century American quilters, Massachusetts “mill girls” of the 1830s, feminist artists of the past 50 years, and women and textile factory work in Asia today.

260. Cultural Tourism.

Tourism is a phenomenon in which art, money, media, colonialism, and ideas about culture come together. From religious pilgrimages to study abroad or the contemporary urbanite’s search for contact with exotic cultures, journeys to unfamiliar places have served many purposes. This seminar presents students with varied perspectives and methodologies through discussion of readings drawn from different fields, and considers tourism in the past, looking at phenomena such as medieval pilgrimages or the Grand Tour in the eighteenth century, and the present, such as the shaping of the Other in Western eyes or the implications of new media. Students’ research projects connect subject matter drawn from their own interests with the idea of tourism, taken in its broadest sense.

262. Impressionism and Post-Impressionism.

This course deals with the interconnecting artistic concerns and subjects of artists such as Manet, Monet, Renoir, Pissaro, Morisot, Cassatt, Cezanne, Van Gogh, and Gauguin. It also investigates ways in which paintings and prints made during the later 19th Century in France in their representations of the city, the suburbs, leisure activities, and gender roles participated in communicating a particular worldview. In addition to developing general skills of analysis students should emerge from the course with a strong feeling for the artists as individuals and artistic personalities, an ability to recognize and date: their pictures, to interpret subjects, and an understanding of the way in which institutions operated in a seminal period in modern art.

263. Twentieth-Century Art.

This course will explore selected aspects of twentieth-century art, including issues of identity, difference, and the body and ways in which institutions have shaped art. Works in different media will be considered, including examples from George Eastman House. The course will focus on a limited time period or a theme.


Focuses on what the critic Andreas Huyssen calls the perceived “Great Divide” between highbrow and lowbrow forms of culture. Explores the emergence of these divisions and interrogates if and how they have blurred in the recent past.

276. Gender and Representation.

In this examination of gender-based artistic practices in several Native North American societies (including Northwest Coast, Plains, Pueblo, Navajo, and Inuit), we will examine how gendered social and artistic roles have altered in response to colonialism in the last two centuries. We will critique some of the entrenched notions in the literature about Native men and women and their art—among them, notions of sacred male “art” vs. secular female “craft,” and authentic vs. touristic products. We will also examine the work of some noteworthy individual artists of the last 100 years in Native North American societies, including some contemporary artists who critique gender roles in their art.
277. Museum and “the Other.”
An examination of how museums have represented Native Americans, Africans, African-Americans, and Aboriginal Australians in a more than a century of public exhibits. From Franz Boas's displays in the American Museum of Natural History in New York in the 1890s to the Native-run National Museum of the American Indian (NMAI) in Washington, DC, and its critique today, pivotal moments of inquiry will include Indian Art of the United States (NY 1941) and Into the Heart of Africa (Toronto, 1990). Contemporary Native American and African American artists have led the critique of the Euro-American culture of representation. We will consider their issues and exhibits, too. Seminar format.

This class will explore the various spiritual and artistic traditions of the indigenous peoples of North America. Ranging from the Canadian arctic to the desert Southwest, we will look at various practices including: shamanism, art and hunting magic in the Arctic, art and curing societies in the Great Lakes and Eastern Woodlands, evidence for religious practice in archaeological contexts, and Kachina societies in the Pueblo southwest. More in-depth readings will focus on Navajo sand painting and healing, and Plains Indian spiritual traditions including the Sun Dance and Vision Quest, and their manifestations in the artistic record. We shall also examine late 19th century crisis cults such as the Ghost Dance Religion, and pan-Indian movements in the 20th century like the Peyote Religion, as well as issues concerning secrecy, privacy, and ethics in the study of Native artistic and religious traditions.

282. Topics in Contemporary Art and Criticism.
Examines specific practices of art and architecture from the 1960s through the 1990s in relation to theories of postmodernism.

283. Contemporary French Film.
Through close analysis of popular film, this course explores contemporary French culture as it reworks national identity. Focusing on changing definitions of “Frenchness” the course examines its articulations with shifting conceptions of tradition, of the popular, and of the nation. Readings include central cultural conflicts around identity and difference in the context of the emergent European economic community, as well as the specifically French context of “immigration” and “assimilation.” Of particular interest is the comparative analysis of French and U.S. popular discourses on social issues involving sexuality and gender, race, ethnicity, and “multiculturalism.” Films include works by Bertrand Blier, Luc Bresson, Andre Techine, Cyril Collard [SAVAGE NIGHTS], Mathieu Kassovitz, Claire Denis, François, Ahmed Bouchaala [Krim], Karim Dridi [Bye-Bye] as well as recent works by such widely known auteurs as Claude Chabrol and Jean-Luc Godard.

287. Culture on Display.
This course looks at the phenomenon of the museum, asking questions about the relation of culture and institutions. How do museums and the selection of what things go into them and the way objects are arranged and displayed shape the way we think about our past, about art? Why are “natural history” and “history” and “art” displayed in different institutions? What are the implications of reproduction for the “original”? Do museums have a future?

ADVANCED COURSES

306. The Sublime.
The principal objective of the course is to undertake a reevaluation of the received ideas associated with the operation of the sublime in 18th century art, literature and thought. We will consider first the concept in the writings of Edmund Burke and Immanuel Kant, the better to understand the parameters of a notion that shaped not only 18th century aesthetic theory but also provided the conditions for the advent of Romanticism. Following this groundwork we will consider a series of topics, including the paintings of Joseph Wright of Derby, Fuselis illustrations to John Milton, the art and poetry of William Blake, the writings of Ralph Waldo Emerson, and the American Sublime. Themes in the course will include the classical sublime, the scientific industrial sublime, the beautiful and the sublime, the picturesque, the natural sublime, the transcendental sublime; and the romantic sublime.

The task of any discussion of frames and framing in the visual arts whether in painting, sculpture, film, performance, architecture, graphic novels and cartoon strips, or digital media is first and foremost to counter the tendency of framing devices to invisibility with respect to the artwork they supposedly contain. We see the work, but we do not see the frame. It is against this tendency to ignore the frame that this seminar is directed. At first glance the frame may seem to be as unproblematic. Starting from a consideration of the foundational texts of frame theory in the philosophy of Immanuel Kant, we will examine the discursive limits of the material and non-material border in the writings of, among others, Mayer Schapiro, Martin Heidegger, Jean-Claude Lebensztejn, Louis Marin, Craig Owens, and Jacques Derrida.

308. Art and Imitation.
This seminar course will address the issue of imitation and Mimesis through the consideration of key texts from antiquity to the present. Texts will include the foundational philosophical works of Plato and Aristotle, the many theorists of literature and art of the sixteenth and seventeenth centuries who wrote on imitation, and the reaction against imitation in modern art. Both graduate and undergraduate students will have the opportunity to select a topic related to their own interests and develop it into a research paper, graduate students will in addition present their paper in class.
311. Dance, Art, and Film.

This course explores relations among dance, art, and film at significant moments in the 20th & 21st centuries. We will study instances in which the arts are closely aligned, including the famous productions by artists Goncharova, Picasso, & Matisse, for Diaghilev’s Ballets Russes; Martha Graham’s partnership with Isamu Noguchi; & Merce Cunningham’s work with Robert Rauschenberg. We will look simply at how dance is filmed or how dance uses film. The course will concentrate on two figures of the postwar American avant-garde: Merce Cunningham & Yvonne Rainer. Cunningham’s dances choreographed for film in collaboration with film & video makers & Rainer’s move from choreography to filmmaking & eventually to hybrids of the two will constitute the core of the course. Other major figures will be explored: choreographers George Balanchine, Doris Humphrey, Trisha Brown, William Forsythe, Anne Teresa De Keersmaeker; & film makers Maya Deren, Ed Emshwiller; Babette Mangolte, Dominique Delouche, Thierry de May, etc.

313. Architecture, Photography, Modern/Postmodern.

The subject of this course is inspired by a series of photographs commissioned from Hiroshi Sugimoto for the Los Angeles Museum of Contemporary Arts’ exhibition At the End of the Century: One Hundred Years of Architecture. Sugimoto’s photographs show canonical works of modern architecture shot out of focus, reduced to both icon and phantom. The seminar considers the changing relations between photography and architecture, between image and space, between picture and object from the advent of modernism to the present. The course looks at these relations in the New Objectivity and the New Vision, Surrealism, the International Style, Mid-Century Modern, and ends by considering the uses of the photography of architecture in Conceptual art and the fascination with modernist architecture in contemporary photographic work. Students read critical studies of modernist architecture and photography and plot the relations between these discourses and practices.

320. Politics of Space.

Prerequisite: permission of instructor.

In this class we will explore how space is constructed and politicized. From the 19th century flaneur to 21st century cyber communities, from the global economy to domestic interiors, space has been and continues to be ideologically contested terrain. Together we will explore these contests. We will pay close attention to questions of identity formation, particularly as they relate to issues of gender, race and class. In addition, we will investigate the importance of technology in transforming the ways in which we think about space.

350. Contemporary Art and Criticism.

This course offers a concentrated analysis of specific decades, and art movements, or even particular artists’ careers with particular attention to shifting critical paradigms.


Cultural critic Stuart Hall has observed “Heritage is a discursive practice. It is one of the ways in which the nation slowly constructs for itself a sort of collective social memory.” In this upper level seminar, we will look at case studies of how people (through the collectivities of gender, ethnicity, race, or nation) construct visual narratives about the past. Among the topics for consideration are Holocaust memorials, Native American and Polynesian museums and cultural centers, African American quilt histories, and even individual artists’ projects of the last few decades (Judy Chicago, Fred Wilson, Silvia Gruner, José Bedia, and Jolene Rickard, among others). Readings will be drawn principally from the disciplines of history, anthropology, cultural studies, and art criticism.

391. Independent Study.

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.

392. Practicum.

Prerequisite: permission of instructor.

Each student will intern in an institution arranged or approved by the Art and Art History faculty. The purpose of this internship is to give students an insiders’ view of the workings of the art world. Students will be expected to document their internship experiences as a means of evaluation at the end of the semester. This program is limited to second, third, fourth and fifth year undergraduate students interested in learning about all aspects of contemporary art, about how art gets made, how it reaches its public, and the processes of its interpretation. Internships will consist of 20 hours per week, for which students will receive eight credits.

393. Art History Honors Project.

See “Requirements for Honors in Art History.”

394. Internships.

Internships in London and the United States.

INTRODUCTORY COURSES

Studio Art (SA)

111. Introductory Drawing.

The coursework follows a sequence of studies that introduces basic drawing techniques, media, and composition through observation and analysis. Through a sequence of projects, students will have the opportunity to develop formal artistic skills and spatial relationships while enhancing their conceptual understanding of art as a visual language. Students will work from life and from the imagination to solve visual problems. Evaluation will primarily be based on the quality and quantity of studio production as well as the effort to thoughtfully contribute to critiques and
discussions. Both traditional and non-traditional mediums and approaches will be explored. Relevant readings and short papers are to be expected.

This course is designed for students who are interested in integrating the practice of drawing with this particular concept. The coursework follows a sequence of studies that introduces basic drawing techniques through the lens of a particular concept. Through a sequence of projects, students will have the opportunity to develop formal artistic skills and spatial relationships while enhancing their conceptual understanding of art as a visual language. Evaluation will primarily be based on the quantity and quality of studio production as well as the effort to thoughtfully contribute to critiques and discussions. Both traditional and non-traditional mediums and approaches will be explored. Relevant readings and short papers are to be expected.

121. Introductory Painting.
Designed to introduce students to the art of painting through a traditional and experimental approach. Through a sequence of projects, students will have the opportunity to practice observational painting skills as well as experiment with a variety of non-traditional media and innovative techniques. This course aims to enhance each student's understanding of historical and contemporary painting trends through studio practice and classroom dialogue. Ultimately, students will work toward creating mature visual works that communicate meaning effectively. Your paintings, in addition to their many other functions, will serve as documentation of your artistic and intellectual pursuit. Formal and informal critiques will regularly follow the completion of most projects. Readings and short papers are to be expected. Not open to seniors.

This course is designed for students who are interested in integrating the practice of painting with this particular concept. This course is designed to introduce students to the art of painting through the lens of a particular concept. This course aims to enhance each student's understanding of historical and contemporary painting trends through studio practice and classroom dialogue. Ultimately, students will work toward creating mature visual works that communicate meaning effectively. Formal and informal critiques will regularly follow the completion of most projects. Readings and short papers are to be expected.

131. Introductory 3D.
A wide range of materials and techniques from metal and welding to assemblage, from wood to experimental methods and media is explored in the service of three dimensional art making. Investigations of the specific qualities of three dimensional media (i.e., space, form, scale, mass) and how they can convey ideas are made within a contemporary framework. Artworks synthesize a particular choice and use of materials and a concept or expression. It is the aim of this class to develop this synthesis, and in so doing, begin to develop the students' own working creative vocabulary. Not open to seniors.

132. Concepts in Introductory 3D.
A wide range of materials, techniques, experimental methods and media is explored through the lens of a particular concept. Investigations of the specific qualities of three-dimensional media (i.e., space, form, scale, mass) and how they can convey ideas are made within a contemporary framework. Materials are used to convey a particular choice and synthesize a concept or expression. It is the aim of this class to develop this synthesis, and in so doing, begin to develop the students' own creative vocabulary.

141. Introductory Photography.
The goal of this course is to begin to formulate conceptual ideas and gain the skills and techniques necessary to synthesize these ideas into photographic images. This course will introduce basic techniques and concepts in contemporary photography. Students will read and write about photographers, artists, historians and theoreticians within the context of studio practice. Techniques covered will include basic 35 mm camera operation, black and white film processing and print development. Not open to seniors.

151. Introductory Digital Art.
For the purpose of this course, the computer and software will be a medium of artistic production. Students will use writings, and readings on contemporary art practice and theory to create work within the framework of contemporary digital art. Software, namely Adobe Photoshop and Macromedia Dreamweaver and/or Flash will be the medium for materializing conceptual ideas. Prior experience with the software used in this course is not required. Not open to seniors.

161. Introduction to Video and Sound.
This course introduces the basic aesthetic and technical elements of video production. Emphasis is on the creative use and understanding of the video medium while learning to use the video camera, video editing processes and the fundamental procedures of planning video projects. Video techniques will be studied through screenings, group discussions, readings, practice sessions and presentations of original video projects made during the course.

171. Introductory 2D.
This introductory course provides a framework for twodimensional studio production; conventional and experimental approaches and processes are investigated, utilized and interrelated. The student will develop technical proficiency, a critical vocabulary, and a broad understanding of art making’s role in culture. Coursework is supplemented with seminar style discussion of selected texts.

172. Concepts in Introductory 2D.
Printmaking is a non-digital, non-photographic manner of visual communication which emphasizes reproduction. This course
will introduce procedures and techniques for creating multiple works on paper. Suites of prints will be made from linoleum cuts, woodcuts, drypoint etchings, monotypes and mono-prints. Drawing is key in the development of the reductive, visual language required in printmaking. Exercises which focus on print-based drawing skills will be assigned throughout. Not open to seniors.

190. Introduction to Studio Practice.
Provides a broad framework for contemporary art practice through studio production, discussion, presentation, and critique. While many courses, including Photography, 3-D, Painting, and Digital Art, often start with the medium and work toward the concept, the projects in this class will immediately integrate conceptual challenges with material and technique. While some projects may include traditional media such as pencils and paper, others may invite nontraditional media such as hair, text, earth and sound. Presentations and discussions will address historical and theoretical approaches to art as a way of supporting expansive studio practice. Practice, critique, readings, and discussion combine to place emphasis on the visual investigation necessary to create educated and challenging art. While Introduction to Visual and Cultural Studies (AH 100) would provide a strong base, it is not a prerequisite for this course. Not open to seniors.

PROGRAM COURSES

222A, B, C. Advanced Painting.
Prerequisite: permission of instructor.
The evolving continuation of painting with serious emphasis on independent proposals, research and production. The broadest examination of painting and related media is expected. Group discussion and individual meetings are on a weekly basis.

232A, B, C. Advanced 3D.
Prerequisite: permission of instructor.
This class broadens the investigation undertaken in Introductory 3D to include other materials and processes as well as a focus on working in an interdisciplinary fashion. This course furthers the development of the student’s three dimensional form vocabulary and their options for articulating their ideas. The ability to verbally and visually articulate ideas is developed through group discussion and critique.

233A, B, C. Issues in Advanced 3D.
Prerequisite: permission of instructor.
Students incorporate a variety of media in works that expand the physical boundaries of art beyond the discreet object. Students’ interests and abilities in a variety of subjects and media are used to create environments that immerse the viewer in sensory, intellectual and emotional experiences. The ability to verbally and visually articulate ideas is developed through group discussion and critique.

242A, B, C. Advanced Photography.
Prerequisite: permission of instructor.
Advanced Photography will examine and expand upon the issues and practice of contemporary photography. Large format photography, studio lighting, fine silver Printing and toning will be covered within a conceptual framework. Students entering this course are expected to have an understanding of contemporary art, artistic writing and be willing to advance their studio practice. Students will be encouraged to combine their work with written research.

244A, B, C. Advanced Color Photo/Digital.
Prerequisite: permission of instructor.
This course is an advanced photography and digital printing class. Work is expected to be conceptually challenging as well as technically sound. We will cover studio lighting, advanced camera operation, multiple film formats, advanced digital manipulation in Adobe Photoshop, scanning, color correction, large format printing, and issues in contemporary art and theory. All work will be shot on film and then scanned. Students must have had SA 141: Introductory Photography and SA 151: Introductory Digital Art or a working knowledge of Adobe Photoshop, and the understanding that additional outside work to catch students up to speed on Photoshop will be required.

Prerequisite: permission of instructor.
This studio production course offers the opportunity to investigate a particular issue through digital media. This course will take into consideration a wide range of design concerns incorporating both traditional design and the design issues of new media. Students will use writings, readings on contemporary art practice and theory to create work within the framework of a particular issue.

262A, B, C. Advanced Video and Sound.
Prerequisite: permission of instructor.
In this advanced production course, video and sound will be considered as independent art forms as well as part of video installations. Students will produce experimental videos and sound pieces. They will also explore the use of these mediums when combined with two- and three-dimensional materials in real time. This course will cover both analogue and digital formats. Must have taken FMS 161/SA 161/ENG 161.

272A, B, C. Issues in Advanced 2D: Narrative/Sequence/Series.
In this course students examine their environment through projects that explore narration, sequence, and series. Creative approaches to narrative and non-narrative sequence are used as a framework for developing personal concepts and overall artistic strengths. Within this context, students create and develop two-dimensional images through a variety of materials and techniques. Students will be introduced to the use of image, color and text as formal and conceptual elements. Coursework consists of both directed and individual projects with an emphasis
on the integration of drawing and printmaking, supplemented with seminar style discussion of selected texts.

273A, B, C. Issues in Advanced 2D.  
Prerequisite: permission of instructor.

In this course students examine their environment through projects that explore a particular issue. Creative 2D approaches are used as a framework for developing personal concepts and overall artistic strengths. Within this context, students create and develop two-dimensional images through a variety of materials and techniques. Course work is supplemented with seminar style discussion of selected texts.

292A, B, C. Markings, Methods, and Materials.  
Prerequisite: permission of instructor.

This course explores the boundaries of conventional studio production through experimentation with nontraditional materials and invented approaches. It investigates the act of making a mark and probes the motives and impulses inherent in that process. The projects demand formal consideration as well as thoughtful content; along with class participation, they act as documents of an engagement in creative thought, research, and problem-solving. Individual and group critiques occur throughout the course. Markings, Methods, and Materials can be viewed as an extension of any 100-level studio course and provides an opportunity to exercise and explore the techniques and cognitive processes that are utilized and applied in art production and adjacent fields of learning.

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

392. Practicum.  
Prerequisite: permission of instructor.

Each student will intern in an institution arranged or approved by the art and art history faculty. The purpose of this internship is to give students an insiders’ view of the workings of the art world. Students will be expected to document their internship experiences as a means of evaluation at the end of the semester. This program is limited to second, third, fourth, and fifth year undergraduate students interested in learning about all aspects of contemporary art, about how art gets made, how it reaches its public, and the processes of its interpretation. Internships will consist of 20 hours per week, for which students will receive 8 credits.

393. Senior Project.  
See “Requirements for Honors in Studio Art.”

396. Senior Studio and Seminar.  
This course is designed to support the transition between undergraduate coursework in the arts & independent, professional, and post-graduate pursuits. The course has 3 essential components: 1. Studio Production and Critique, 2. the Mechanics of the Profession, and 3. Contemporary Artists and Issues as they relate to Visual and Cultural Theory, Art History, & Art Criticism. The production component will consist of the intensive critique of ongoing studio work with emphasis on the importance of shifting toward self-motivated production. The fall semester will serve as the first half of the development toward a solo thesis exhibition & includes an artist talk, which includes documentation, explanation, reference, & an explanation of the relevance of the students work in the context of contemporary art. The spring semester includes a solo exhibition of the students work that is the culmination of their research & production. This class is limited to & required of senior studio majors.

397. Senior Studio and Seminar  
Prerequisite: permission of instructor.

This course is designed to support the transition between undergraduate coursework in the arts and independent, professional, and post-graduate pursuits. The course has three essential components: (1) Studio Production and Critique, (2) the Mechanics of the Profession, and (3) Contemporary Artists and Issues as they relate to Visual and Cultural Theory, Art History, and Art Criticism. By the end of the semester, students will have prepared an artist talk on their work through documentation, explanation, reference, and relevance in the context of contemporary art. This class is limited to and required of senior studio majors. (Spring)
Asian Studies

The Asian Studies Certificate Program at the University of Rochester is designed to permit students majoring in the social sciences and humanities to develop knowledge of Asian cultures and languages as a complement to their disciplinary concentration.

Asian Studies Certificate Program

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 those listed under the heading of Modern Languages and Cultures (Chinese or Japanese), Religion and Classics (Sanskrit), or Allied Asian Courses.

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 Multidisciplinary Studies Center. Students who plan to enroll in the program should pick up an application in 4209B Dewey and consult one of the advisors there.

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

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

PRIMARY COURSES

Anthropology

**ANT 264. Islam and Global Politics.**

The response of the Islamic world to European colonialism and American foreign policy.

Modern Languages and Cultures—Japanese

**JPN 210. Traditional Japanese Culture.**

An overview of Japan’s traditional culture through the most prominent examples of it visual, literary, and performing arts, with attention to the social contexts of aesthetic experience and to ideas of a “national culture.” Taught in English, additional work available in Japanese where appropriate.

**JPN 214. Atomic Creatures: Godzilla.**

Origins and development of the Japanese kaiju eiga (monster film); nuclear imagery and the science fiction/horror/creature film genre.

**JPN 217. Traditional Japanese Literature.**

An exploration of traditional Japanese literature.

**JPN 218. Reel War: War on Film.**

An exploration of war as it is portrayed on film.

**JPN 219. Manga and Anime.**

An exploration of Japanese popular culture as portrayed by the cartoon culture of manga (graphic novels) and anime (Japanese Animation). Material ranges from the origins of print and moving picture cartoon culture in the early twentieth century to the present. Issues addressed include national identity, global consumption, and genre cross fertilization, providing an opportunity to explore how Japanese culture informs these now widely popular forms of popular entertainment.

**JPN 219A. Tourist Japan.**

Japan’s image as a foreign destination, focusing on 1900-1970: Japan defining itself and being defined by others through visual and material culture; the value of material culture in historical practice and theory.

**JPN 220. Culture of Urban Japan, 1650–1805.**

This course examines the spectacular urban culture of the Edo period against the background of new economic, political, and legal developments. Of special interest is the world of theaters and entertainment quarters that both reflected and supported the art and literature created by new constellations of social groups.

**JPN 222. Japanese Theater.**

**JPN 233. The Culture of Zen.**

Zen Buddhism was the core around which many of Japan’s greatest cultural achievements evolved. From the medieval period on, with its importation from China, the culture of Zen served as the primary context for much of Japanese metaphysics, architecture, landscape and interior design, medicine, ink painting, noh drama, haiku poetry, as well as the entire cultural complex known as the tea ceremony. Along with the Zen doctrinal and textual roots of these remarkable achievements, this course will examine the vibrant culture fostered in the medieval Zen monastic temple institution known as the Gozan and its dispersal into the culture at large.

**JPN 234. Haiku Poetry.**

Haiku poetry and its related art form, haiga ink-painting, were among the most important of the poetic and artistic genres of early-modern (1600-1900) Japan. This course studies the works of the great haiku masters Basho, Buson, Issa, and Shiki.
**JPN 246. Issues in Contemporary Culture.**

This seminar course is based on research on and discussion of a variety of issues of contemporary concern in Japan, including national, ethnic and racial identity; changing gender and sex roles; the family and generational conflict; immigration and work; the emperor system, war, and memory; cultural authenticity; and Japan's changing roles in Asia and in the world. Readings on issues begin with articles in the online English-language editions of Japan's main news media, extend outward to reports in the US news media, and eventually to popular and scholarly English-language studies of the issues involved. Grading is based on participation in informed discussion of issues raised in class (20%), and on four papers on issues to be chosen by each student with the instructors permission (20% each).

**JPN 247. Samurai Connections.**

**JPN 253. Japanese Fascism and Mishima.**


**JPN 255. Novels of Murakami Haruki.**


**JPN 256. The City in Film.**

**JPN 261. Kyoto.**

Credit—2 hours.

This course examines the various forces that shaped Kyoto from the point of view of history, urban studies, religion, and art.

**JPN 263. Great Novels of China and Japan.**

**JPN 273. Japanese Women Writers.**

A critical and historical introduction to Japanese women writers: the socio-historical, cultural, and ideological context for and emergence of a literary tradition.

**JPN 283. History of Japanese Cinema.**

Japanese cinema from its origins to the 1960s: genre, narrative, diversity of style, theory, and technology; the visual image in a social, cultural and historical context.

**JPN 284. Mobsters, Monsters, and Swords.**


**JPN 285. Director Studies: Akira Kurosawa.**

The films of Akira Kurosawa, his co-workers, and the contemporary issues and aesthetic influences important to his career.

**JPN 286. Japanese New Wave Cinema.**


**JPN 287. Nagisa Oshima.**

The works of Nagisa Oshima: Shochiku, the Japanese New Wave, independent cinema, and beyond.

**JPN 290. Women in Japanese Film.**

Explores the representation of women in contemporary Japanese film. Begins with a sample of the prototype heroines (predominant in the films of Mizoguchi, Naruse, Ozu) who set the standard for what some Japanese critics describe as a “special Japanese brand of feminism,” which they call “the worship of womanhood.” Also examines genres based on gender-role archetypes and adaptations of women’s literature.

**JPN 291. Contemporary Japanese Cinema.**

Japanese cinema’s engagement with its contemporary context, focusing on reworking and reinterpreting familiar genres and Japanese cinema’s significance in the global marketplace.

**JPN 292. Japanese Animation.**

Anime as film form and cultural phenomenon. Content varies, from a survey of anime genres to the world views and visual style of specific directors; emphasis on anime as hybrid popular culture both local and global.

**JPN 294. Hayao Miyazaki and Planet Ghibli.**

A course on the work of the animated films of Hayao Miyazaki, the world view and visual sensibilities of his creation, Studio Ghibli, and anime as film form and cultural phenomenon. Focusing on Miyazaki’s films, we will examine the “nuts and bolts” of animated cinematic construction (use of narrative space, character design, etc.); methods of adaptation, influence, and genre variation; anime reception and fan culture; and issues of race, gender, landscape, identity and cultural conscience. Such detailed analysis reveals the range and possibilities of anime and its place in popular culture on a local and global scale.

**Modern Languages and Cultures—Chinese**

**CHI 211. Introduction to Pre-Modern Chinese Literature.**

In this survey we will read major authors, works, and literary genres of Chinese literature before the 20th century, with attention to several central and intertwining themes: literature and the spaces of the imagination; the experience of the past and the subversion of tradition; changing relations between fiction and history; the reimagining of gender relations through the retelling of narratives; and the emergence of a vibrant urban culture. No background in Chinese literature is required or assumed.
**CHI 212. Cities and the Country in Modern China.**

Explores changing cultural meanings of country and city from early 20th century urban culture through revolution and to the present era of mass migration and urban destruction and renewal.

**CHI 215. Powers of Images.**

In this course, we will examine how literature from China, Japan, Turkey, and the West explores such questions of images. We will track how understandings of the powers of images change, persist, and are re-appropriated across historical time and cultural space, and consider the critical light “premodern” texts and texts from our "modern" world of images can project upon each other.

**CHI 220. Chinese Landscapes.**

This course explores one of the world’s longest-running traditions of landscape representation. We’ll consider such landscape genres as poetry, fiction, travel narrative, maps, painting, and photography, and consider their work across China’s long history of imperial expansion, colonization, and globalization. We’ll also consider China’s places in thinking about landscape and travel in the West. All readings in English.

**CHI 232. Asian Calligraphy: History and Practice.**

An introduction to the Chinese and Japanese writing systems, including their historical development, artistic practices, and practical applications. One meeting per week will be devoted to the study of calligraphy. Ideal for those studying Chinese or Japanese, but experience in the languages, while helpful, is not required.

**CHI 233. Chinese Visual Culture: Medium and Materiality.**

This course explores the cultural politics of Chinese visual culture through an examination of its mediums. We’ll consider how in pre-twentieth-century China, paintings structured relations of gender and of inner and outer worlds; how the inscription of calligraphy on land mediated image and writing, nature and culture; and how the mass production of artworks intersected with conceptions of nature and social organization. We’ll then consider the new media culture of the 1920s–1930s, iconoclasm and idolatry during the Cultural Revolution, and the emergence of experimental and documentary art in recent decades. Our concern will be how mediums, as assemblages of images and surfaces with specific material qualities and practices function within real social spaces and create virtual spaces of representation and imagination.

**History**

**HIS 105. Traditional Japan.**

Japanese history from the beginning to around 1850. Emphasis is on the changing nature of political authority, the changing roles of the aristocrats, samurai warriors, and commoners, the emergence of new cultural forms, and the transformation of traditional Japanese society. Readings include literature, diaries, political, social, and economic history, and material on Japanese women. Several films are shown in conjunction with the course.

**HIS 108. Traditional China.**

This course gives students an overview of pre-modern China from its earliest time to 1600s. The course covers the formation of Chinese civilization from its multiple origins, the canonization of literary texts in a long period, the establishment of the imperial states and their functions, the interaction with groups of people on the borders and its significant effects, the long searching for the economic settlement in the transitive periods, social chaos and its solutions, and China’s splendid ancient cultures. The multiple historical layers of “tradition” require a pluralistic rather than monolithic approach. Tradition’s diverse meanings have been not only shaped by the practices of different peoples in a long period history, but also filtered through our contemporary ideological access to the histories we are revisiting.

**HIS 183. Modern China.**

This class covers the search for modern China in the twentieth century. We will trace how China, between invasion, war, and revolution, transformed from an empire to a republic, from republic to Communist state, and from Communist state to the economic powerhouse that it is today.

**HIS 184. Modern Japan.**

The course will focus on the modern history of Japan from 1850 into the 1990s. The transformation of Japan from a traditional into a modern, industrial society with its costs, disruptions, and benefits will be emphasized. The emergence of Japan as a major power in East Asia, its expansion into Korea and Manchuria, and the growing conflict with the West, leading to the Pacific War, will also be covered as will Japanese postwar political, social, and economic change.

**HIS 238. History of British India.**

This course surveys the history of the Indian sub-continent from the coming of the British in the seventeenth century to its partition and independence in 1947. Course readings will emphasize the colonial experience and the results of colonial contact, especially as seen through changes in discourses, social structures, cultural norms, and collective identities. Readings will include essays, novels, and histories by both British and Indian writers. Class format will be a mix of lectures, discussions, and films.

**HIS 280W. The Asian-American Experience.**

The class will study the history and cultural experiences of Asian immigrants and Asian-Americans in the United States and Hawaii in the nineteenth and twentieth centuries.

**HIS 296W. Women in East Asia.**

In seminar format, students read and discuss books and articles on women’s history in Japan, China, and Korea. Differences in their responses to the modern world and their role in the history of modern East Asian society is emphasized. The study of women in modern East Asian history is used as a vehicle to improve student’s critical reading, speaking, and writing skills.
HIS 314W. International Human Rights.
What does it mean to be human? What political, economic, religious, social, or sexual rights might be part of different people’s working definitions? This course will look at both a) the historical development of conflicting theories of human rights and b) more contemporary debates about their ideal extent, their exercise, and their enforcement. Special topics will include debates over the meaning of the American and French Revolutions, the fight to design an International Declaration of Human Rights in the aftermath of World War II, the history of organizations such as Amnesty International, and the controversy around UN events such as the 1995 World Conference on Women in Beijing, the 2002 World Summit on Sustainable Development in Rio de Janeiro, and the 2000 and 2005 Millennium Summits in New York City.

HIS 347W. Tokugawa Japan, 1560–1850.

Readings on the history and historiography of eighteenth-century Great Britain, the European Empires, and North America from the Glorious Revolution through the American Revolution, adoption of the U.S. Constitution, and the presidencies of George Washington and John Adams. Readings address social, political, intellectual, and cultural issues, the history of slavery, race relations, religion, the environment, immigration, and American Indians.

HIS 387W. Nation and Culture in Twentieth-Century China.
This course focuses on the evolution and expression of Chinese nationalism from the fall of the Qing dynasty (1911) through the Second World War and Communist Revolution (1949).

HIS 388W. Modern China in Film.
There is no singular History due to representation and interpretation. This course regards film footage as a unique way to reproduce history of modern China. Students will watch the first-rate Chinese films produced by the most distinguished Chinese directors, in which the major historical events in modern China provided a narrative context. We will examine the multiple, sometime controversial and even contradictory representations of major historical events in modern China, including the Opium War, the Arrow War, the New Cultural Movement, Nanchang Uprising, Nanjing Massacre, the Second Sino-Japanese War, the Great Leap Forward, the Great Proletarian Cultural Revolution, and the Tiananmen Incident.

HIS 389W. Gender in Late Imperial and Modern China.
This course will examine problems in the interpretation of gender in the non-Western world with China as the primary historical example. We will focus on the understanding and deployment of gender under a succession of regimes in Chinese history: the Confucian/imperial order, missionary reformism, elite modernization, and state socialism. Readings will include some primary sources (in English translation), major secondary works, and theoretical/comparative essays.

Religion and Classics

The basic teachings of Hinduism and Buddhism as to human nature and the paths to liberation.

REL 106. From Confucius to Zen.
The teachings, practices, and social impact of the major religious traditions of China and Japan.

REL 173. Religions of Japan.

REL 255. Hindu Goddesses and Women.
Ways in which women understand themselves as Hindus and the ways in which they have been understood.

REL 260. Hindu Ascetics, Mystics, and Doctors.
A close study of Hindu traditions focused on the theories and practices of esoteric Yoga, Tantra, and medicine.

REL 261. Hindu Tantric Yoga.
An advanced introduction to the mysticism of the Hindu Tantras. Additional readings explore its historical and philosophical dimensions.

REL 262. The Bhagavadgita.

REL 263. Japanese Noh Drama.

REL 266. Buddhist Philosophy.
Major developments in Buddhist thought and practice through study of key figures in Indian, Southeast Asian, Tibetan, and East Asian traditions

REL 270. Medicine, Alchemy, and Religion in India.
An introduction to the Indian traditions of medicine, healing, and self-transformation from historical, theoretical, and practical perspectives.

REL 271. Medieval Hindu Philosophy.
Studies in Vedanta, Kashmir Saivism, and other systems of thought.


REL 310. Seminar in Mahabharata.
A study of the Mahabharata, the great Hindu epic, focusing on the symbolism of its narrative and the problems involved in its interpretation of myth and ritual.
REL 311. Hindu Tantrism and Esoteric Traditions.

MODERN LANGUAGES AND CULTURE, RELIGION AND CLASSICS (LANGUAGES)

Any offering from Modern Languages and Cultures (Chinese and Japanese) or Religion and Classics (Sanskrit)

ALLIED ASIAN COURSES

History

HIS 201. The Third World.

The origins of colonialism and “underdevelopment” in the rise of European capitalism. The struggles of the colonial and postcolonial peoples for political independence, cultural autonomy, and economic development.

Undergraduate Program in Biology and Medicine

Committee of Track Coordinators

Ernest J. Nordeen, PhD (California, Irvine)
Professor of Brain and Cognitive Sciences, of Psychology, and of Neurobiology and Anatomy

Cheeptip Benyajati, PhD (Princeton)
Associate Professor of Biology and Director

James D. Fry, PhD (University of Michigan)
Associate Professor of Biology

Elizabeth J. Grayhack, PhD (Cornell)
Associate Professor of Biochemistry and Biophysics

Elaine A. Sia, PhD (Columbia)
Associate Professor of Biology

Richard Barth, PhD (SUNY, Buffalo)
Associate Professor of Microbiology and Immunology

J. David Lambert, PhD (University of Arizona)
Assistant Professor of Biology

Anthony J. Oleck, PhD (SUNY, Albany)
Senior Lecturer in Biology

Undergraduate education in the biological sciences at the University of Rochester involves an unusually close collaboration between the arts and sciences and the School of Medicine and Dentistry. Undergraduates may choose to obtain either a BA or BS degree in biology or a BS degree in biological sciences with specialization in one of six areas: biochemistry, cell and developmental biology, evolutionary biology and ecology, microbiology, molecular genetics, or 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 56 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 students need not make a premature choice between the degrees offered. The BA and BS degrees require a common core of courses: BIO 110 and 111/111L or 112 and 113/113L, Principles of Biology I and II or Perspectives of Biology I and II; and BIO 198, Principles of Genetics. These core courses are to be taken in sequence. The students may then sample several gateway courses in the specific areas of the six BS curricula; these courses may be used as part of a BS program (as required or as diversification courses) or may become part of a BA curriculum. In addition, most of the
courses required in the allied fields (chemistry, mathematics, and physics) are the same for both of the degrees offered. Students interested in pursuing a BS in biological sciences are urged to begin fulfilling the chemistry requirements in the first year. A typical program for the first two years that would prepare a student for a BA degree is listed below. Students seeking a BS degree would take the same first-year sequence of courses, but the coursework taken in the second year might differ somewhat.

### First Year (Fall)
- **BIO 110 or 112**
- **CHM 131**
- **MTH 141/161 or 161Q**
- **English Elective**

### First Year (Spring)
- **BIO 111 or 113L or BIO 113/113L**
- **CHM 132**
- **MTH 142, 162, or 162Q**
- **Elective**

### Second Year (Fall)
- **BIO 198 and 198L**
- **CHM 204/208 lab or CHM 172Q/210 lab**

### Second Year (Spring)
- **BIO 250**
- **CHM 204/208 lab or CHM 172Q/210 lab**
- **Elective**
- **Elective**

### BA in Biology
The BA curriculum is intended to provide students 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 (minimum 32 credits) necessary to earn the degree, only the three core courses are specifically required. Students must also satisfy a laboratory requirement.

### BS in Biological Sciences
The BS curricula stress 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 biology introductory courses, three to six advanced courses, and one to two additional biology diversification courses (depending on the concentration) selected from outside the area of specialization. To earn a BS degree, a total of 40 to 47 credits of coursework in the biological sciences is required.

### BS in Biological Sciences: Biochemistry
Studies include basic concepts of metabolism, protein structure and function, and experimental techniques. In the senior year a wide variety of optional courses is offered allowing specialization in enzymology, membrane biochemistry, DNA, and RNA structure and formation.

### BS in Biological Sciences: Cell and Developmental Biology
Studies include 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.

### BS in Biological Sciences: Evolutionary Biology and Ecology
Studies include evolution, ecology, animal behavior, population genetics, ecological genetics, and molecular evolution. The major emphasis in all courses is on the dynamic processes influencing organisms and populations in nature. The subject matter presented concentrates on integrating comparative, experimental, and theoretical methods to study evolutionary and ecological processes. An emphasis in this program is the integration of behavioral, ecological, molecular, and genetic methods to investigate ecological and evolutionary questions.

### BS 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.

### BS in Biological Sciences: Molecular Genetics
Studies include 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.

### BS in Biological Sciences: Neuroscience
Neuroscience, which is an interdisciplinary pursuit, deals with the mechanics 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.

### Advanced Placement
Students with an AP biology score of 4 or 5 receive 4 general elective credits but not credit towards the biology major or minor. Students retain these general elective credits regardless of the biology courses they take.

### 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 BA or BS 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:
- **Biology Courses**—three (12 credits) with associated labs.
  - **BIO 110 or 112; 111 or 113; 198; and BIO/BCH 250**
Independent Research and Degrees with Distinction

The facts, theories, and principles taught in our formal courses ultimately derive from research in the laboratory or the field. Students are encouraged to experience the challenges, successes, frustrations, and excitement of research by arranging independent research in the laboratories of individual members of the faculty in the Undergraduate Program in Biology and Medicine and faculty in various departments in the nearby University of Rochester School of Medicine and Dentistry. 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). Each semester approximately 50 to 60 students take independent research courses with faculty members in the UPBM program. Research projects can also be conducted during the summer through de 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 in research after successful completion and defense of a written dissertation. The deadline for applying for a degree with distinction in research is February 28 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 (487/488 Hutchison Hall).

Upper-Level Writing Requirement

Majors in all of the biology department’s areas of concentration must complete either two upper-level writing requirements in their major or one in their major and one in another natural science. When students declare their major, they are advised of the possible ways to meet the requirement. For more information, please visit the UPBM website at www.rochester.edu/College/BIO/UPBM.

Biochemistry and Biophysics

Robert A. Bambara, PhD (Cornell)
Professor of Oncology in Biochemistry and Biophysics and of Microbiology and Immunology

William A. Bernhard, PhD (Penn State)
Professor of Biochemistry and Biophysics

Mark E. Dumont, PhD (Johns Hopkins)
Professor of Biochemistry and Biophysics

Philip J. Fay, PhD (Rochester)
Professor of Biochemistry and Biophysics

Thomas E. Gunter, PhD (California, Berkeley)
Professor of Biochemistry and Biophysics

Jeffrey J. Hayes, PhD (Johns Hopkins)
Professor of Biochemistry and Biophysics and of Oncology in the Cancer Center

Russell Hilf, PhD (Rutgers)
Professor of Biochemistry and Biophysics and of Oncology in the Cancer Center

Mahin D. Maines, PhD (Missouri)
Professor of Biochemistry and Biophysics and of Environmental Medicine and Dean’s Professor of Toxicology in the Dean’s Office

Lynn E. Maquat, PhD (Wisconsin-Madison)
Professor of Biochemistry and Biophysics

Eric M. Phizicky, PhD (Cornell)
Professor of Biochemistry and Biophysics

Terry Platt, PhD (Harvard)
Professor of Biology and Adjunct Professor of Biochemistry and Biophysics

Fred Sherman, PhD (California, Berkeley)
Marie Curran Wilson and Joseph C. Wilson Professor of Biochemistry and Biophysics and Professor of Biochemistry and Biophysics

William Simon, PhD (Harvard)
Professor of Biochemistry and Biophysics

Harold Smith, PhD (Buffalo)
Professor of Biochemistry and Biophysics

Barry A. Goldstein, PhD (Rochester)
Associate Professor of Biochemistry and Biophysics

Elizabeth J. Grayhack, PhD (Cornell)
Associate Professor of Biochemistry and Biophysics

David A. Pearce, PhD (Bath)
Associate Professor of Biochemistry and Biophysics

Joseph E. Wedekind, PhD (Wisconsin-Madison)
Associate Professor of Biochemistry and Biophysics

Yi-Tao Yu, PhD (Case Western Reserve)
Associate Professor of Biochemistry and Biophysics

Alan A. Grossfield, PhD (Johns Hopkins)
Assistant Professor of Biochemistry and Biophysics

Fred Hagen, PhD (Calgary)
Assistant Professor of Biochemistry and Biophysics

Clara L. Kielkopf, PhD (California Institute of Technology)
Assistant Professor of Biochemistry and Biophysics

David H. Mathews, PhD (Rochester)
Assistant Professor of Biochemistry and Biophysics
Joshua Munger, PhD (Chicago)
Assistant Professor of Biochemistry and Biophysics

The Department of Biochemistry and Biophysics is comprised of over 40 faculty with well-funded and active research programs in many diverse areas. Our graduate education programs are affiliated with other departments, including biology, chemistry, immunology, microbiology and vaccine biology, and cancer biology. Graduate students in our PhD programs, therefore, have a great deal of flexibility to rotate through many different types of research labs.

Requirements for Biochemistry

- **Introductory Courses**—Three (12 credits). BIO 110 or 112; 111/111P or 113/113P; and BIO 198/198P.
- **Laboratory Experience**—One and a half labs (5 credits). BCH 208 and one from the following: BIO 111P, 113P, 198P, or 151. With the permission of the track coordinator, 2 semesters (8 credits) of Independent Research (BCH 395) can replace the requirement for BCH 208 laboratory. In this event, BCH 395 cannot be used to fulfill an advanced course requirement
- **Required Biochemistry Core Courses**—Six (24 credits). BIO 250, 202, IND 408, 410, and two courses from the following: BCH 412, BIO 243, CHM 252, 437, IND 409, 447, MBI 473, or an Independent Research (BCH 395) with the track advisor’s approval. Only one semester of BCH 395 is allowed to count in the track requirements.
- **Elective/Diversification**—One course from outside the biochemistry 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. Visit the UPBM website for list of course offerings.
- **Allied Fields**—Nine courses with indicated laboratories (36 credits). Two semesters of calculus, four semesters of chemistry (two general and two organic courses) with labs, two semesters of calculus-based physics with labs, one additional approved course in math, statistics, or computer science.

The following is a typical program:

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**Degree with Distinction in Research**

A degree with distinction in research is an honor that recognizes a student for outstanding accomplishments in research. Students majoring in the Undergraduate Program in Biology and Medicine (UPBM) with research of exceptional quality and a minimum BIO GPA of 2.7 may apply for candidacy during their senior year. Candidates must have developed a novel body of work that includes publication quality data from which to generate a senior thesis. In addition, candidates must successfully present and defend their senior thesis before a faculty examination committee.

**Upper-Level Writing Requirement**

Majors in all of the biology department’s areas of concentration must complete either two upper-level writing requirements in their major or one in their major and one in another natural science. When students declare their major, they are advised of the possible ways to meet the requirement. For more information, please visit the UPBM website at www.rochester.edu/College/BIO/UPBM.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**208. Biochemistry Laboratory.**

Introduction to the theory and practice of biochemical, molecular, and structural biology techniques. Students gain first-hand experience with state-of-the-art techniques and data analysis through their participation in experiments that emphasize particular assays, methods, or instrumentation. Computational analysis of macromolecular structure and DNA sequence database searches and alignments are integral components of the students’ experience.
395. Research in Biochemistry

Arrangements for independent research in biochemistry can be made with any faculty member in the biochemistry track. Contact can be made directly with the appropriate faculty member or through the Committee for the B.S. Track in Biochemistry. Students may take this course up to two times with a particular faculty member. BCH 395 courses may be used to fulfill some of the requirements for distinction in research, provided that prior approval of the track coordinator is obtained.

408. Advanced Biochemistry.

Designed to provide graduate students and advanced undergraduates with an understanding of biochemical and biophysical approaches currently being used to study broad areas of biomedical research and to expose students to major unsolved problems in biochemistry and biophysics. In addition to 80 minute lectures, weekly workshops allow discussion of papers from the current literature and problem sets.

410. Molecular Biology and Genetics.

This course is designed primarily for graduate students. One-hour lectures cover modern topics of interest, including DNA replication; DNA repair and mutagenesis; regulation of RNA transcription in eukaryotes; RNA processing, and protein translation. Emphasis is placed on both biochemical and genetic approaches to the study of these problems. Special additional topics include genomics as an approach to regulation and mammalian genetic techniques of analysis.

Biology

Gloria M. Culver, PhD (Rochester)
Professor of Biology

Thomas H. Eckbush, PhD (Johns Hopkins)
Professor of Biology

David S. Goldfarb, PhD (California, Davis)
Professor of Biology

John Jaenike, PhD (Princeton)
Professor of Biology

Joanna B. Olmsted, PhD (Yale)
Professor of Biology; Dean, School of Arts and Sciences

H. Allen Orr, PhD (Chicago)
University Professor, Shirley Cox Kearns Professor, and Professor of Biology

Terry Platt, PhD (Harvard)
Professor of Biology and Adjunct Professor of Biochemistry and Biophysics

John H. Werren, PhD (Utah)
Professor of Biology

James D. Fry, PhD (University of Michigan)
Associate Professor of Biology

Vera Gorbunova, PhD (Weizmann Institute of Science)
Associate Professor of Biology

Rulang Jiang, PhD (Wesleyan University)
Associate Professor of Biomedical Genetics in the Center for Oral Biology, of Dentistry, and of Biology

Daven Presgraves, PhD (Rochester)
Associate Professor of Biology

Elaine A. Sia, PhD (Columbia)
Associate Professor of Biology

Michael Welte, PhD (Chicago)
Associate Professor of Biology

Daniel Garrigan, PhD (Arizona)
Assistant Professor of Biology

Richard Glor, PhD (Washington University)
Assistant Professor of Biology

Heinrich Jasper, PhD (Heidelberg)
James P. Wilmot Distinguished Assistant Professor and Assistant Professor of Biology

J. David Lambert, PhD (University of Arizona)
Assistant Professor of Biology

Robert Minckley, PhD (Kansas)
Adjunct Assistant Professor of Biology

Douglas Portman, PhD (Pennsylvania)
Assistant Professor of Biomedical Genetics and of Biology

Justin M. Ramsey, PhD (University of Washington)
Assistant Professor of Biology

Andrei Sueluanov, PhD (Weizmann Institute of Science)
Assistant (Research) Professor of Biology

Alan Dietsche, PhD (Kentucky)
Senior Lecturer in Biology

Anthony J. Olek, PhD (SUNY, Albany)
Senior Lecturer in Biology

Graduate students, in partial fulfillment of requirements of their PhD degree, work closely with faculty as teaching assistants to aid in instructional programs.

The Department of Biology administers curricula leading to four of the seven undergraduate concentrations offered through the Undergraduate Program in Biology and Medicine: (1) BA in Biology, (2) BS in Biological Sciences: Cell and Developmental Biology, (3) BS in Biological Sciences: Molecular Genetics, and (4) BS in Biological Sciences: Ecology and Evolutionary Biology. A minor in biology is also available.

Planning a Curriculum

See Undergraduate Program in Biology and Medicine Undergraduate Program in Biology and Medicine or visit UPBM website at www.rochester.edu/College/BIO/UPBM.
BA in Biology

The requirements for the BA in biology are

- **Introductory Courses**—Three (12 credits). BIO 110 or 112, 111L or 113L, and 198L.
- **Laboratory Experience**—One and one-half laboratories. Any combination of laboratories listed below will satisfy the laboratory requirement. Most students complete BIO 111L, 113L, 151, and 198L concurrently with the lecture course and then choose a third laboratory that complements an interest. Half labs (meet once a week) are BIO 111L, 113L, and 198L. Full labs (meet twice per week) are BIO 225, 228, 268, BCH 208, MBI 221, and BIO 395.
- **Advanced Courses**—Two (8 credits.) Select one course from groups A and B.
  - Group B: BIO 250, Biochemistry; BIO 202, Molecular Biology; BIO 210, Molecular Cell Biology; BIO 215, Molecular Biology of Cell Signaling; and BIO 226, Developmental Biology.
- **Elective/Diversification**—Three courses (12 credits.) Three courses are to be selected from any of those offered through the Undergraduate Program in Biology and Medicine, including approved Independent Research 395. Biology elective courses must be 200-level or higher. For lists of UPBM elective/diversification courses, please visit the UPBM website at www.rochester.edu/College/BIO/UPBM/.
- **Allied Fields**—Eight courses with indicated laboratories. Two semesters of general chemistry with lab, one semester of organic chemistry with lab, one semester of general physics with lab, two semesters of calculus, two additional approved courses in math, statistics, computer science, chemistry, or physics.

BS 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.

BS in Biological Sciences: Ecology and Evolutionary Biology

This track encompasses the studies of behavior, ecology, population genetics, evolution, and biodiversity. Together these disciplines attempt to understand how the processes of adaptation affect the activities of individuals, local breeding and foraging groups, and larger populations by natural selection, as well as by other forces that shape the genetic and phenotypic character of populations and species. The sheer number of the mechanisms underlying population phenomena and especially evolutionary change, as well as the numbers of individuals and genes involved and the great variety of different kinds of ecological interactions possible, predispose the subject to formulation in mathematical models that must be tested through observation of natural populations. Students in this program are encouraged to gain experience with the use of analytical, sampling, and experimental techniques of laboratory and field biology.

The requirements for the BS in ecology and evolutionary biology are

- **Introductory Courses**—Three (12 credits). BIO 110 or 112, 111L or 113L, and 198L.
- **Laboratory Experience**—One and one-half labs (6 credits total). BIO 228. Strongly recommended half labs (1 credit) are BIO 111L or 113L and 198L.
- **Required Cell and Developmental Biology Core Courses**—Five courses (20 credits). BIO 210, 226, 250, and two courses to be chosen from the following list or from courses approved by the track coordinator: BIO 220, 222, 243, IND 447, BIO 215, MBI 473.
- **Elective/Diversification Courses**—One (4 credits). To be selected from those courses offered through the Undergraduate Program in Biology and Medicine, outside of the BCD curriculum, and approved by the track coordinator. Visit the UPBM website for course offerings: www.rochester.edu/College/BIO/UPBM/.
- **Allied Fields**—Nine courses (36 credits). Two semesters of calculus, four semesters of chemistry (two general and two organic courses) with lab, two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab, one additional approved course in math, statistics, or computer science.
list above as Ecology and Evolutionary Biology core courses may not be used to fulfill the elective/diversification requirement.

- **Allied Fields**—Nine courses (36 credits). Two semesters of calculus, two semesters of general chemistry with lab, one semester of organic chemistry with lab, one semester of calculus-based physics with lab, one semester of statistics, two additional approved math, statistics, computer science, physics, or chemistry courses.

  NOTE: CSC 108 and 110 are not acceptable.

**BS in Biological Sciences: Molecular Genetics**

Molecular genetics is the study of the structure of genes and the mechanisms involved in their maintenance, alteration (mutation), expression, replication, recombination, and transmission. Molecular geneticists seek to describe these events in terms of the properties and interactions of DNA, RNA, proteins, and other molecules.

The requirements for the BS in molecular genetics are

- **Introductory Courses**—Three (12 credits). BIO 110 or 112; 111 or 113, and 198.
- **Laboratory Experience**—One and a half laboratories. BIO 268 (4 credits) plus one other full or half laboratory. It is recommended that students take BIO 111L and 198L as part of the introductory courses to complete the requirement. Please visit the UPBM website for the full list of laboratories: www.rochester.edu/College/BIO/UPBM/upbm课文.htm.
- **Molecular Genetics Core Courses**—Five (20 credits). BIO 215, 210, 222, 226, IND 410.
- **Elective/Diversification**—One course (4 credits). This course must be a 200-level course from outside the molecular genetics curriculum. It is to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and must be approved by the track coordinator. Visit the UPBM website for course offerings: www.rochester.edu/College/BIO/UPBM/upbm课文.htm.
- **Allied Fields**—Nine courses (36 credits). Two calculus courses, four semesters of chemistry (two general and two organic courses) with lab, two semesters of calculus-based physics, one additional approved course in math, statistics, or computer science.

**Minor in Biology**

The requirements for a minor in biology are

- **Introductory Courses**—Three (14 credits). BIO 110 or 112; 111 or 113; and 111L or 113L, or 198 or 198L.
- **Advanced Courses**—Two (minimum 8 credits). These courses are to be selected from any of those offered through the Undergraduate Program in Biology and Medicine and approved by the program director. Please visit UPBM website for course offerings: www.rochester.edu/College/BIO/UPBM/upbm课文.htm.

- **Laboratory Requirement**—One lab or one lab equivalent (two half labs). BIO 111L, 113L, 151, and 198L are half labs as they are included in the courses.
- **Allied Fields**—Two courses of chemistry with labs.

No independent study or research course (391 or 395) may be counted toward the minor in biology. The biology department undergraduate advisor grants approval of courses chosen for the minor.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**104K. Ecosystem Conservation and Human Society.**

A new approach in conservation biology. Identifies, places economic value on natural ecosystems (clean water and air, waste decomposition, pollination and farmland productivity). Other approaches in conservation, review of services ecosystems provide, ways the value of services are determined, and influencing economic and political policy.

**110. Principles of Biology I.**

First semester in a course sequence for majors. Biochemistry, molecular and cellular evolution, cell reproduction, genetics and molecular biology.

**111. Principles of Biology II.**


**111P. Introductory Biology Lab.**

Accompanies the lecture course Principles of Biology II. Plant and animal diversity, biology of protista, animal behavior, bioinformatics, and physiology. Problem solving, critical thinking and experimental design.

**112. Perspectives in Biology I.**

First semester of a two-course introductory sequence. Biochemistry, molecular and cellular evolution, cell reproduction, fundamentals of genetics and molecular biology. Emphasis on chemistry underlying biological processes, experimental approaches, data analysis, and quantitative methods. Offered to students with an AP Biology score of 5.

**113. Perspectives in Biology II.**

Second semester of a two-course introductory. Evolution, organismal diversity, ecology, and functional biology. Emphasis on experimental approaches, data analysis, quantitative methods, and reading original papers. Open only to freshmen.
**113P. Perspectives in Biology Lab.**
Accompanies the lecture course Perspectives in Biology II. Includes biological diversity, ecology, evolution, animal behavior, physiology and bioinformatics. Emphasis is placed on problem solving, critical thinking and experimental design.

**151. Introduction to Biochemistry Lab.**
Complements Biochemistry lecture. Experimental design and data analysis using enzyme assays, electrophoretic gels, antibodies, and light microscopy.

**190. Genetics and the Human Genome.**
Basics of Mendelian and molecular genetics with a focus on the structure, function and evolution of the human genome.

**198. Principles of Genetics.**
Methods of genetic analysis are stressed. Topics include: Mendelian assortment; gene interaction; linkage and mapping; methods of genetic analysis in yeast, bacteria and phage; DNA replication, recombination, repair and mutation; gene expression and its regulation; transposons and retroviruses; recombinant DNA technologies; cancer as a genetic disease.

**198P. Principles of Genetics Lab.**
Introduction to basic genetic theory and laboratory practices. Classical inheritance in eukaryotes, bacterial genetics and molecular technology techniques. Emphasis is on data analysis and experimental design.

**202. Molecular Biology.**
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.

**205. Evolution.**
Survey of Evolutionary Biology. Topics include history of evolutionary thought, population and quantitative genetics, origin and history of life, speciation, and human evolution.

**210. Cell Biology.**
An intermediate level course that covers fundamental cell processes at the molecular level. Topics include organelle structure and functions, membrane biogenesis, cytoskeleton, cell signaling, cell cycle growth, and death.

**215. Molecular Biology of Cell Signaling.**
Basic molecular mechanisms of signal transduction, and study how these mechanisms are used in different contexts to direct cell fate during development, physiology and disease. The course will draw heavily on experiments from the classic and most recent primary literature.

**220. Advanced Cell Biology.**
Mechanistic understanding of cellular organization and function. Topics include cytoskeleton, membrane traffic, cell signaling, cell cycle. Primary research literature, classic and recent. Design and interpretation of experiments, drawn from biochemistry, microscopy and genetics. Oral presentations, written assignments, and classroom discussions.

**222. Biology of Aging.**
Emphasizing molecular mechanisms of aging. Will discuss popular theories of aging, model organisms used in aging research, evolution of aging, relation between aging and cancer, human progeroid syndromes, and interventions to slow aging.

**225. Ecology and Evolutionary Biology.**
Development of testable questions and implementation of appropriate observations and experiments on a series of topics in ecology and evolution. Many mini-studies will be done in the field on non-model organisms native to New York. Experience on field and lab methods used in ecology and evolutionary biology, critiquing published scientific studies, writing scientific reports, and presentation of scientific results.

**226. Developmental Biology.**
Cellular and molecular aspects of animal development, with emphasis on processes and underlying mechanisms. Topics include embryonic cleavage, gastrulation, early development of model vertebrates and invertebrates, patterning of cell fates along embryonic axes of Drosophila and vertebrates, organogenesis and stem cells.

**243. Eukaryotic Gene Regulation.**
Mechanisms of transcription initiation, eukaryotic chromosome structure and its modifications, mechanisms of chromatin mediated regulation of gene expression, as well as epigenetics and functional genomics. Lectures and readings draw heavily on primary literature both classic and most recent.

**247. Environmental Animal Physiology.**
Understanding animal function by examining how animals cope with environmental challenges, e.g., cellular and physiological adaptations to extremes of temperature, salinity, and altitude.

**250. Introduction to Biochemistry.**
Fundamental aspects of biochemistry, including bioenergetics, protein structure, kinetic analysis of enzyme action, and general intermediary metabolism will be covered. Along with exploration structure-function relationships in biomolecules.

**253. Computational Biology.**
An introduction to the history, theory, and practice of using computers to conduct biological research. Topics include the fundamentals of Linux-based computing and perl programming, accessing and storing biological data, alignment of molecular sequences, and computer-based analysis of data.
258. Human Anatomy.
Human Anatomy is the detailed study of the human organism at the cellular, tissue and organ systems levels. The relationship between structure and function is covered with emphasis on structural relationships. The course includes both lectures and laboratory sessions, an provides a basis for further professional and clinical experience.

Examines animal behavior from an ecological and evolutionary perspective. Topics include social organization, mating systems, foraging, aggression, and animal learning. Students also learn quantitative techniques in behavioral biology.

261W. Genetic Research A.
Hands on experience in conducting animal behavior research, with a focus on the genetics of behavior using Nasonia vitripennis. Behaviors investigated include mate preference, host acceptance, courtship, dispersal, activity level, territoriality, aggression, and flight. Develop methods of quantitative behavioral observation, genetic crossing, data analysis, polymerase chain reaction (PCR), animal husbandry, research record keeping, basic bioinformatics, and research presentation.

262W. Genetic Research B.
Hands on experience in conducting genetic research, with a focus on the genetics of complex traits such as behavior, development, morphology and/or physiology. Genetics of complex traits is an exciting and rapidly growing field.

263. Ecology.
A survey of adaptations to the physical environment, dynamics of natural populations, interactions between species, and human impact on the environment.

265. Molecular Evolution.
Evolution at the molecular level. Basic evolutionary principles to infer history from DNA sequences; determine what forces have shaped the evolution of genes and genomes; understand the relationship between molecular evolution and phenotypic evolution; and address applied problems, like assigning biological function to genome sequences, finding the sources of epidemics, and finding the genes involved in human disease.

266. Tree of Life.
Survey of life's diversity with an emphasis on understanding phylogenetic relationships and patterns of biological diversity over time and among groups. Computational methods for reconstructing phylogenetic trees and the application of resulting trees to addressing major questions in ecology and evolutionary biology.

268. Laboratory in Molecular, Cell, and Developmental Biology.
This course is designed to provide (1) introduction to model organisms, (2) training in specific methods used in molecular, cell and developmental biology research, with emphasis on data acquisition and analysis, and (3) experience in the design and execution of experiments, reading and writing scientific reports, and public scientific presentation.

271W. Topics in Drug Development.
Explore drug development approaches, including evaluation of natural products, screening compound libraries, and rational drug design. Write short pieces that serve as building blocks for the final review article. Out-of-class time commitment for writing, revising, self-assessment, and peer-review.

272W. Developing a Professional Biology Writing Portfolio.
Writing in a way that describes science to non-scientists. Short writing assignments that tailor information about a single topic to different audiences. Identify the area(s) to concentrate efforts, and write and revise significant piece of scientific writing. Writing, revising, self-assessment, and peer-review.

391. Independent Study.
395. Independent Research.
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.
Microbiology and Immunology

Professor

Stephen Dewhurst, PhD (Nebraska)
Professor of Microbiology and Immunology

John G. Frelinger, PhD (California Institute of Technology)
Professor of Oncology in Microbiology and Immunology

Barbara H. Iglewski, PhD (Penn State)
Professor of Microbiology and Immunology

Jian-Dong Li, PhD (California, San Francisco)
Professor of Microbiology and Immunology

Edith Lord, PhD (California, San Diego)
Professor of Oncology in Microbiology and Immunology

Robert E. Marquiss, PhD (Michigan)
Professor of Microbiology and Immunology

Marilyn A. Menegus, PhD (Cornell)
Professor of Microbiology and Immunology, of Pathology, and of Pediatrics

Jim Miller, PhD (Washington)
Professor of Microbiology and Immunology

Richard Barth, PhD (SUNY, Buffalo)
Associate Professor of Microbiology and Immunology

J. Scott Butler, PhD (Illinois-Urbana)
Associate Professor of Microbiology and Immunology

Virginia Clark, PhD (Rochester)
Associate Professor of Microbiology and Immunology

Deborah Fowell, PhD (Oxford)
Associate Professor of Microbiology and Immunology

Constantine G. Haidaris, PhD (Cincinnati)
Associate Professor of Microbiology and Immunology

Dwight J. Hardy, PhD (Louisiana)
Associate Professor of Microbiology and Immunology

Baek Kim, PhD (Arizona)
Associate Professor of Microbiology and Immunology

Sanjay Sahni, PhD (Kanpur)
Associate Professor of Microbiology and Immunology

David Topham, PhD (Vermont)
Associate Professor of Microbiology and Immunology

Alexandra M. Livingstone, PhD (Cambridge)
Research Associate Professor of Microbiology and Immunology

Sally A. Quataert, PhD (Buffalo)
Research Associate Professor of Microbiology and Immunology

Assistant Professor

Mary Anne Courtney, PhD (Louisville)
Assistant Professor of Microbiology and Immunology

Michelle Dziezman, PhD (Pennsylvania)
Assistant Professor of Microbiology and Immunology

Minsoo Kim, PhD (Ohio)
Assistant Professor of Microbiology and Immunology

José A. Lemos, PhD (Federal Univ. of Rio de Janeiro)
Assistant Professor of Microbiology and Immunology

Luis Martinez-Sobrido, PhD (Navarra)
Assistant Professor of Microbiology and Immunology

Toru Takimoto, PhD (Japan-Hokkaido University-Sapporo)
Assistant Professor of Microbiology and Immunology

Brian Ward, PhD (Illinois-Urbana)
Assistant Professor of Microbiology and Immunology

Mingtao Zeng, PhD (Israel-Tel Aviv)
Assistant Professor of Microbiology and Immunology

All members of the faculty may serve as preceptors of MBI 395. The Department of Microbiology and Immunology annually has up to 10 teaching assistants serving as laboratory instructors in introductory courses.

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 uses 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 BS 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.

BS in Microbiology

- Introductory Courses—Three (12 credits). BIO 110 or 112; 111/111P or 113/113P; and 198/198P or an approved alternate.

- Laboratory Experience (2–3 labs). MBI 221W, Microbiology Lab, required and is recommended to be taken during the fall of the junior year.

- Supplementary Laboratory Course—One additional laboratory course (4 credits). It may be a full-laboratory course in a biological science (may also satisfy the elective/diversification requirement); two half-laboratory courses; or an approved Independent Research 395 course, which does not count as an elective/diversification course.
• Required Microbiology Core Courses—Six (24 credits). MBI 220, 221W lab (recommended to be taken in the junior year), BIO 250, and three courses to be chosen from the following list: MBI 414, 421, 431, 456, 473.

• Elective/Diversification—One course not in the microbiology curriculum. It is to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and approved by the track coordinator. Visit the UPBM website for list of course offerings.

• Allied Fields—Nine courses with indicated laboratories (36 credits). Two semesters of calculus, four semesters of chemistry (two general and two organic courses) with lab, two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab, one additional approved course in math, statistics, or computer science.

Degree with Distinction in Research
A degree with distinction in research is an honor that recognizes students for outstanding accomplishments in research. Students majoring in the Undergraduate Program in Biology and Medicine (UPBM) with research of exceptional quality and a minimum BIO GPA of 2.7 may apply for candidacy during their senior year. Candidates must have developed a novel body of work that includes publication quality data from which to generate a senior thesis. In addition, candidates must successfully present and defend their senior thesis before a faculty examination committee.

Upper-Level Writing Requirement
Majors in all of the biology department’s areas of concentration must complete either two upper-level writing requirements in their major or one in their major and one in another natural science. When students declare their major, they are advised of the possible ways to meet the requirement.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

220. Introduction to Microbiology.
This course provides an introduction to bacteria and viruses. Major topics discussed are: bacterial and viral structure; microbial metabolism, genetics, growth, evolution, diversity and ecology; and microbial interactions with humans, including nonspecific and specific (immune) host defenses and mechanisms of microbial pathogenesis.

221W. Microbiology Lab.
This course is designed to accompany MBI 220. It allows the students to have direct experience in handling microorganisms and studying their properties. Emphasis is placed on learning basic laboratory skills and techniques; collecting and recording data; and analyzing experimental results. Some exercises are performed by individual students, while others are carried out in small groups. Each student will also complete a semester-length project.

395W. Research in MBI.

414. Microbial Pathogenesis.
An examination of host-parasite interactions and the mechanisms by which microbes evade the host response and cause disease. The emphasis is on an understanding at the molecular level of microbial pathogenesis, including colonization, invasion, antigen variation, and toxin production and mode of action. In addition, an understanding of how host defense mechanisms interact with pathogenic microbes will be examined. Graduate students must register for MBI 514 seminar. (Alternate years)

421. Microbial Genetics.
This course provides an in-depth examination of representative genetic systems in bacteria and bacterial viruses. Emphasis is placed on the methods of genetic analysis used to study biological function. The material covered includes: the nature of bacterial variation, processes affecting gene synthesis and integrity, the nature of gene transfer in bacteria and the regulation of gene expression in prokaryotes. Graduate students register for MBI 521 Seminar.

431. Microbial Physiology.
This course provides a survey of microbial physiology with emphasis on metabolism, regulation, cell walls, membranes, ecology and adaptation to extreme environments. The class meets twice per week for two lectures of 75 minutes each. Extensive handout materials are provided, and readings are from the current literature. Doctoral students must register for MBI 531 Seminar. (Fall, alternate years)

Provides an introduction to animal virology, with emphasis on human disease. Topics covered include the following: general properties of viruses, methods in viral research, virus structure, biochemistry of virus replication, virus-host cell interactions, pathogenesis, HIV/AIDS, emerging infections, vaccines, antivirals, and viral vectors and gene therapy.

473. Immunology.
Innate and adaptive immunity; structure and genetics of immunoglobulins and T cell receptors; lymphocyte development, immune regulation, immunological diseases, tumor immunity.
Neuroscience

Professor

Gregory DeAngelis, PhD (California, Berkeley)
Professor of Brain and Cognitive Sciences, of Biomedical Engineering, of Neurobiology and Anatomy, and in the Center for Visual Science

Carol K. Kellogg, PhD (Rochester)
Professor of Brain and Cognitive Sciences and of Psychology

Ernest J. Nordeen, PhD (California, Irvine)
Professor of Brain and Cognitive Sciences, of Psychology, and of Neurobiology and Anatomy

Kathy W. Nordeen, PhD (California, Irvine)
Professor of Brain and Cognitive Sciences, of Psychology, and of Neurobiology and Anatomy

Associate Professor

William E. O’Neill, PhD (SUNY, Stony Brook)
Associate Professor of Brain and Cognitive Sciences and of Neurobiology and Anatomy

Alexandre Pouget, PhD (California, San Diego)
Associate Professor of Brain and Cognitive Sciences and in the Center for Visual Science

Senior Lecturer

David Holtzman, PhD (SUNY Health Science, Brooklyn)
Senior Lecturer, Brain and Cognitive Sciences

Biological systems are composed of a variety of cell types, each performing highly specialized tasks. Neuroscience adopts a multidisciplinary approach to the study of nervous systems, and endeavors to understand how cells of this organ system function to generate and regulate behavior. Nerve cells perform some of the most complex tasks of the body, imparting behavioral and physiological individuality to an organism. Accordingly, some of the most debilitating diseases known are associated with a failure in the function of these cells.

Neuroscience at the University of Rochester was established in 1973 as an interdepartmental concentration undergraduate degree program and was initiated by student interest. It integrates fields as diverse as anatomy, biochemistry, biology, physiology, and psychology, and is one of only a few undergraduate programs in neuroscience available in the United States. Neuroscience majors gain a solid background in biology, chemistry, physics, and mathematics, along with a concentration of courses in neuroscience. As one of the BS tracks in the University’s Undergraduate Program in Biology and Medicine (UPBM), it draws upon the collective strengths of several departments on the River Campus and at the Medical Center.

BS in Biological Sciences:
Neuroscience

- Introductory Courses—Three (14 credits). BIO 110 or 112, 111 and 111P or 113 and 113P, and either 198, 250, or 210. The laboratory section associated with 198 is optional for the neuroscience concentration but is highly recommended.

- Required Neuroscience Core Courses—Five and three fourths (23 credits). NSC 201 and 201P, 203 (it is recommended that this course be taken before the senior year), either 301 or 302, and three electives chosen from the following list:

- at least one from Group A—NSC 243, 249, IND 447;
- at least one course from Group B—NSC 221, 244, 245.

the third elective may be from Group A, B, or Group C—NSC 242, 246,* 508,* BCS 547.

- Elective/Diversification—Two courses (8 credits). These courses must be from outside the neuroscience curriculum and are to be selected from those courses offered through the Undergraduate Program in Biology and Medicine and must be approved by a neuroscience advisor.

- Allied Fields—Four semesters of chemistry (two general and two organic courses) with lab. Two semesters of calculus, two semesters of calculus-based physics (PHY 113, 114 or PHY 121, 122) with lab, and BCS 200 and 200P (Statistical Analysis and Experimental Design with lab)—must be taken before enrolling in NSC 203. STT 212 plus BCS 200P may be taken in place of BCS 200.

Sample Neuroscience Program

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<th>First Year</th>
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<tr>
<td>BIO 110/112</td>
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<td>CHM 131</td>
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<td>Writing</td>
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<td>MTH 141/161</td>
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<td>NSC 201, 201P</td>
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<td>BCS 200, 200P or STT 212</td>
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Degree with Distinction in Research

A degree with distinction in research is an honor that recognizes students for outstanding accomplishments in research. Students majoring in the Undergraduate Program in Biology and Medicine (UPBM) with research of exceptional quality and a minimum BIO GPA of 2.7 may apply for candidacy during their senior year. Candidates must have developed a novel body of work that includes publication quality data from which to generate a senior

* Recommended for seniors only and requires permission of instructor.
thesis. In addition, candidates must successfully present and defend their senior thesis before a faculty examination committee.

**Upper-Level Writing Requirement**

Majors in all of the biology department’s areas of concentration must complete either two upper-level writing requirements in their major or one in their major and one in another natural science. When students declare their major, they are advised of the possible ways to meet the requirement. For more information, please visit the UPBM website at www.rochester.edu/College/BIO/UPBM.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

### 201. Basic Neurobiology.

Explores fundamental concepts of neural organization and function. Covers gross and cellular neuroanatomy, neuronal cell biology, the electrophysiology of neurons and synapses, neurochemistry, spinal circuitry, sensory and motor systems, and higher functions including learning and memory.

### 201P. Basic Neurobiology Lab.

This laboratory is required for students intending to take BCS 203 (NSC 203), including all Neuroscience majors. Students who do not intend to take BCS 203 (NSC 203) are not required to take BCS 240P (NSC 201P).

### 203. Laboratory in Neurobiology.

Introduces the various methods used in neurobiological research. Covers anatomical, behavioral, molecular, and physiological approaches to studying neural organization and function and concludes with a research project that extends over a period of five weeks.

### 221. Audition.

Examines the physiological substrate responsible for hearing. Topics include the physical stimulus for hearing, receptive aspects of speech and language, peripheral physiology (the outer and middle ears, cochlea, and auditory nerve), and central physiology (brainstem nuclei, auditory cortex, descending systems). Introduces electrophysiological techniques used to study auditory function, and explores sensory and perceptual correlates of physiology and sensorineural hearing loss.

### 242. Neuropsychology.

Examines clinical neuropsychology, which bridges neurology, neuroscience, and clinical psychology. Covers history of clinical neuropsychology, principles of neuropsychological assessment, and the interpretation of cognition and behavior as they relate to brain dysfunction. Considers specific neurological syndromes including neurodegenerative, cerebrovascular, toxic, and memory disorders; epilepsy; head trauma; toxic disorders; infectious processes; pediatric neuropsychology; psychiatric syndromes; and forensic neuropsychology. Patient presentations (videotape and in-person interviews) supplement lectures.


Introduces the field of neurochemistry with an emphasis on cellular and molecular neurochemistry. Topics range from study of neurochemical mechanisms that underlie normal neural function to discussion of behavioral disturbances that result from neurochemical abnormalities. Considers neurochemical mechanisms of adaptive behavior, learning and memory, behavioral disorders, gender differences, and drug seeking behavior.

### 244. Neuroethology.

Explores the neural basis of naturally occurring animal behaviors. Emphasizes how information is integrated from interactions between molecules, cells, and groups of cells, all of which are necessary to produce behavior. Considers how hormones, neural development, anatomy, physiology, and evolution lead to behaviors such as orientation, communication, feeding, and reproduction.

### 245. Sensory and Motor Neuroscience.

Focuses on how single neurons and populations of neurons represent sensory information, how sensory signals are transformed and decoded to mediate perception, and how perceptual signals are converted into neural commands to initiate actions. Explores how simple behaviors (such as detection and discrimination) can be quantified and explained in terms of neural activity. Introduces students to quantitative approaches for linking neural activity to perception and decision-making. Emphasizes studies of the visual, oculomotor, and somatosensory systems, with some attention to the auditory and vestibular systems as well.

### 246. Biology of Mental Disorders.

Examines the neurobiology of anxiety/phobic conditions, mood disorders, and chronic psychotic states, particularly schizophrenia. Considers definitions of psychiatric syndromes, the problems of diagnosis, brain organization, and neurotransmitter systems involved in state functions. Introduces research approaches including epidemiologic, phenomenologic, family/adoption, longitudinal descriptive, psychophysiological, neuropharmacology, genetic linkage, and postmortem studies; emphasizes recent in vivo brain imaging and neuroreceptor studies.

### 249. Developmental Neurobiology.

Advanced treatment of the development of the nervous system, including the nature/nurture issue and factors that influence the development of neural organization and function. Topics include the production, migration, differentiation and survival of neurons; functional specialization of neural regions; axonal navigation; target mapping. Compares and contrasts developmental plasticity with forms of neural plasticity exhibited in adults.
**301. Senior Seminar in Neuroscience.**

To be taken for one semester in the senior year (2 credits). Format can vary from an emphasis on exploring neuroscience as a scientific career to more thematically-based seminars dealing with recent research in neuroscience. Oral and written presentation skills are sharpened through a series of student-led presentations on current issues or topics in neuroscience, as well as a series of short reports.

**302. Seminar in Neuroscience.**

To be taken for one semester in the senior year (2 credits). Format can vary from an emphasis on exploring neuroscience as a scientific career to more thematically-based seminars dealing with recent research in neuroscience. Oral and written presentation skills are sharpened through a series of student-led presentations on current issues or topics in neuroscience, as well as a series of short reports.

Undergraduates who wish to enroll in graduate-level neuroscience courses must be declared majors in their senior year and have consulted their faculty advisor as well as the course instructor(s) for permission.

Further information on the undergraduate program as well as the 4-1 BS/MS program is available from the Undergraduate Neuroscience Program office, 103 Meliora Hall, and from Professor Ernie Nordeen, Neuroscience Track Coordinator, in the Department of Brain and Cognitive Sciences, 103 Meliora Hall. Also consult our web page at www.bcs.rochester.edu/neuro/index.html.
Elissa Newport, PhD (Pennsylvania)
George Eastman Professor of Brain and Cognitive Sciences and Professor of Linguistics

Ernest J. Nordeen, PhD (California, Irvine)
Professor of Brain and Cognitive Sciences, of Psychology, and of Neurobiology and Anatomy

Kathy W. Nordeen, PhD (California, Irvine)
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Gary D. Paige, PhD (Chicago)
Kilian J. and Caroline F. Schmitt Professor of Neurobiology and Anatomy, Professor of Neurology, of Ophthalmology, of Biomedical Engineering, of Surgery, of Brain and Cognitive Sciences, and in the Center for Visual Science

Tatiana Pasternak, PhD (Copenhagen)
Professor of Neurobiology and Anatomy, of Brain and Cognitive Sciences, and in the Center for Visual Science

Marc Schieber, MD (Washington University, St. Louis)
Professor of Neurology, of Neurobiology and Anatomy, and of Brain and Cognitive Sciences

Duje Tadin, PhD (Vanderbilt)
Professor of Brain and Cognitive Sciences and in the Center for Visual Science

Michael K. Tanenhaus, PhD (Columbia)
Beverly Petterson Bishop and Charles W. Bishop Professor, Professor of Brain and Cognitive Sciences, of Psychology, and of Linguistics; Director, Center for Language Sciences

David R. Williams, PhD (California, San Diego)
William G. Allyn Professor of Medical Optics, Professor of Optics, of Brain and Cognitive Sciences, of Psychology, of Biomedical Engineering, of Ophthalmology, and in the Center for Visual Science; Director of the Center for Visual Science; Dean for Research

Loisa Bennetto, PhD (Denver)
Associate Professor of Psychology and of Brain and Cognitive Sciences

Krystel Huxlin, PhD (Sydney)
Associate Professor of Ophthalmology, of Neurobiology and Anatomy, of Brain and Cognitive Sciences, and in the Center for Visual Science

Joyce McDonough, PhD (Massachusetts)
Associate Professor of Linguistics and of Brain and Cognitive Sciences

Jonathan W. Mink, MD (Washington University)
Associate Professor of Neurology, of Neurobiology and Anatomy, of Pediatrics, Child Neurology, and of Brain and Cognitive Sciences

William E. O’Neill, PhD (SUNY, Stony Brook)
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Alexandre Pouget, PhD (California, San Diego)
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Jeffrey Runner, PhD (Massachusetts, Amherst)
Associate Professor of Linguistics and of Brain and Cognitive Sciences

Ted Supalla, PhD (California, San Diego)
Associate Professor of Brain and Cognitive Sciences and of Linguistics; Director, American Sign Language Program

T. Florian Jaeger, PhD (Stanford)
Assistant Professor of Brain and Cognitive Sciences and of Computer Science

The Department of Brain and Cognitive Sciences represents an academic discipline that integrates biological, behavioral, and computational methods to study perception, cognition, and action and the brain activity that underlies them. Faculty and students in the department study how we see and hear, move, learn and remember, reason, produce and understand spoken and signed languages, and how these remarkable capabilities depend upon the workings of the brain. They also study how these abilities develop, and how the brain matures to become able to organize such complex behavior.

The programs in the Department of Brain and Cognitive Sciences (BCS) offer rigorous but accessible natural science concentrations for students interested in how we perceive, think, and learn, and what brain mechanisms make these abilities possible. The programs have two aims: (1) to provide sound intellectual training in an analytic science that will benefit students in a wide range of career paths; and (2) to provide a strong background for students contemplating graduate or professional training in the behavioral and neural sciences. The curricula provide excellent routes to learn the logic and methods of scientific inquiry and how to reason critically, and provide unique opportunities to engage in research problems at the frontiers of knowledge.

The BA curriculum consists of two foundation courses; three core courses built on these foundations; a statistics course; a laboratory course; four upper-level electives organized around a theme chosen by each student; and a senior seminar.

The BS curriculum includes all the requirements for the BA degree in BCS, and also incorporates foundational and advanced work in related allied fields, including biology, computer science, math, and symbolic systems.

There is no requirement to undertake a research project, but students are encouraged to take advantage of the many research opportunities available in the department. All of the faculty in brain and cognitive sciences have active research programs, and qualified undergraduates can participate directly in scientific discovery through independent research courses and the honors program.

In addition to the BA and BS in brain and cognitive sciences, the department administers the curriculum leading to a BS in biological sciences with specialization in neuroscience, offered through the Undergraduate Program in Biology and Medicine. Also, the Department of Clinical and Social Sciences in Psychology provides a curriculum leading to a BA in psychology. Further information can be obtained from the Department of Brain and Cognitive Sciences’ web pages (www.bcs.rochester.edu) or the department’s Undergraduate Programs Office, 103 Meliora Hall, (585) 275-0541.

The department also offers a minor and a number of clusters that provide an introduction to the field and allow students freedom to pursue topics of special interest.
**Undergraduate Organizations**

The Department of Brain and Cognitive Sciences supports an undergraduate council for students interested in the discipline. The council organizes trips to conferences, brings in guest speakers, organizes faculty/student mixers, promotes the brain and cognitive sciences major, and holds office hours for undergraduates interested in tutoring. Additional information about this organization is available on the department’s web pages.

**BA in Brain and Cognitive Sciences**

The BA program provides introductory background to all areas of brain and cognitive sciences and encourages deep exploration of one subfield within BCS. It differs from the BS in that it requires fewer courses and thus allows greater flexibility in overall program planning. The BA program is particularly suitable for students with focused interests in a single area of BCS and those wishing to pursue double degrees or double majors. The concentration consists of 12 courses.

- Two foundation courses (BCS 110 and 111) provide a general introduction to the field; one examines the neural machinery that underlies behavior, and the other introduces the domain of cognitive science.
- Three core courses (BCS 151, 152, 153) build on the foundation courses by providing a fuller exploration of the major scientific problems we study—perception and action, language, and cognition.
- A statistics course (BCS 200 or STT 212) and a laboratory course (BCS 203, 204, 205, or 208) introduce the fundamentals of experimental design and analysis, and provide hands-on experience with how we acquire knowledge about the brain and behavior. The brain and cognitive sciences draw on a wide variety of scientific methods, and students can choose from among laboratory courses that emphasize different techniques. All courses stress analytical thinking and technical writing and provide a solid grounding for students to undertake major research projects.
- Depth of knowledge is achieved through four upper-level electives. At least three must be 200-level courses, and three of the four should form a coherent “track” around some theme within BCS. The department offers examples of common track themes (see below), but students can form their own tracks in consultation with their advisor and with the approval of the director of undergraduate studies.
- Students complete their degree with the Senior Seminar (BCS 310 or 311), a 2-credit course that focuses on reading, evaluating, and discussing primary research papers and writing an evaluation of papers as though providing peer review for a journal. The course also includes discussions of the work of visiting speakers. Honors students enroll in BCS 311 and write and present a senior thesis.

**Sample Track Themes**

**Neuropsychology and Mental Disorders**
- BCS 240. Basic Neurobiology
- BCS 242. Neuropsychology
- BCS 243. Neurochemical Foundations of Behavior
- BCS 246. Biology of Mental Disorders
- BCS 265. Language and the Brain

**Psycholinguistics**
- LIN 110. Introduction to Linguistic Analysis
- BCS 172. Development of Mind and Brain
- BCS 259. Language Development
- BCS 261. Language Use and Understanding
- BCS 264. Signed Language Structure
- BCS 265. Language and the Brain

**Perception and Action**
- BCS 220. The Intelligent Eye
- BCS 221. Audition
- BCS 223. Vision and the Eye
- BCS 245. Sensory and Motor Neuroscience

**Computation and Cognition**
- BCS 220. The Intelligent Eye
- BCS 232. Artificial Intelligence
- BCS 233. Statistical Speech and Language Processing
- BCS 235. Natural Language Processing
- BCS 236. Machine Vision

**Development**
- BCS 172. Development of Mind and Brain
- BCS 240. Basic Neurobiology
- BCS 249. Developmental Neurobiology
- BCS 259. Language Development

**Music and Language Cognition**
- BCS 260. Music and the Mind
- BCS 221. Audition
- BCS 259. Language Development
- BCS 261. Language Use and Understanding
- BCS 265. Language and the Brain

**Speech and Hearing**
- LIN 110. Introduction to Linguistic Analysis
- BCS 221. Audition
- BCS 259. Language Development
- BCS 261. Language Use and Understanding
- BCS 264. Signed Language Structure
- BCS 265. Language and the Brain

*Students interested in pursuing graduate work in speech and hearing are strongly encouraged to take Introduction to Sound Systems (LIN 210) even though it cannot be used to fulfill the BCS track requirement.*
BS in Brain and Cognitive Sciences

The BS program provides a broad and rigorous natural science education that prepares students for postgraduate work in BCS and related fields (e.g., cognitive science, cognitive neuroscience, computational modeling). In addition to BCS courses, the curriculum entails a foundation in math, biology, computer programming, and symbolic systems so as to prepare students for all advanced courses within the discipline. The BS major consists of 20 courses.

**General Science Foundation Courses (four courses required)**
- One cell biology (BIO 110 or BIO 112)
- One calculus (MTH 161 recommended or MTH 141 acceptable)
- One symbolic systems (LIN 110, CSC 173, 242)
- One computer programming (ECE 114, CSC 161, 170, or 171)

**All of the BA Requirements (12 courses, see descriptions above)**
- Two BCS foundations courses (BCS 110, 111)
- Three BCS core courses (BCS 151, 152, 153)
- One statistics course (BCS 200 or STT 212)
- One laboratory course (BCS 203 or 204 or 205 or 208)
- Four upper-level electives
- One senior seminar (BCS 310)

**Allied Field Electives (two courses)**
These electives can be chosen from the list of approved allied field courses in mathematics, computer science, biology, chemistry, physics, philosophy, music theory, linguistics, optics, or engineering. This list may be found at www.bcs.rochester.edu/undergrad/allied_fields.html. They should be chosen, in consultation with a faculty advisor, to relate to the track theme formed by the BCS electives.

**Open Electives (two courses)**
These can be BCS or approved allied field elective courses.

**Sample Track Themes**

**Artificial Intelligence/Computation**
The track in artificial intelligence and computation focuses on the design of computer simulations that mimic how people create and manipulate mental and neural representations. A variety of topics can be explored within the context of this track, including the use of mental and neural representations for the purposes of sensory perception, motor action, linguistic communication, and reasoning and decision making. To support these topics of interest, allied field electives typically are chosen from computer science and mathematics. This track is particularly suitable for students interested in pursuing advanced degrees in cognitive science, computational neuroscience, or artificial intelligence.

**Language**
The track in language focuses on how people produce and understand spoken and signed languages and how children learn language. A variety of topics can be explored within the context of this track, including the perception and production of speech, the development of language in children, natural language processing, the formal structure of language and computer models of language. To support these topics of interest, allied field electives typically are chosen from linguistics, computer science, and philosophy. This track is particularly suitable for students interested in pursuing advanced degrees in cognitive science, psycholinguistics, linguistics, and computational linguistics, or in more applied fields such as speech sciences and communication disorders.

**Neurobiology**
The track in neurobiology focuses on the biology of the nervous system with special emphasis on biological mechanisms of cognitive behavior. A variety of topics can be explored within the context of this track, including the physiological foundations of sensory perception and motor behavior, relationships between brain dysfunction and cognitive/behavioral deficits, and the cellular and molecular processes that influence the development of brain and behavior. To support these topics of interest, allied field electives typically are chosen from biology or chemistry. This track is particularly suitable for students interested in pursuing advanced degrees in neuroscience, neuropsychology, or medicine.

**Perception and Action**
The track in perception and action focuses on sensory systems and how humans and animals use sensory information to perceive the world and guide actions. Topics that can be studied in this track include how our eyes, ears, and other sensory organs work, how the brain interprets information from the senses for perception and action, and how to construct artificial sensory and robotic systems. To support these topics of interest, allied field electives typically are chosen from biology, physics, mathematics, and computer science. This track is well suited for students interested in pursuing advanced degrees in cognitive science, vision science, neuroscience, or artificial intelligence or more applied degrees in fields such as physical therapy, optometry, or audiology.

**Honors in Brain and Cognitive Sciences**
Faculty in the department have active research programs and strongly encourage undergraduates to become engaged in research projects. A research project fosters independent thinking, encourages teamwork, and prepares students well for postgraduate employment and advanced degree programs. Students in either the BA or BS degree programs wishing to make a substantial investment in research may do so through the honors research program. Generally, this program is begun before the end of the junior year after completion of at least one semester of independent research. Students who intend to participate in the honors research program should notify the undergraduate
program secretary of this intent as soon as possible and no later than the end of the fall semester of their senior year. A degree with Honors in Research is awarded to students who successfully complete the following additional requirements:

- Maintain a 3.3 GPA in BCS courses.
- Complete two semesters of independent research with the thesis advisor. The final semester should be registered as Honors Research (BCS 396).
- Before enrolling in honors research, submit a three-page thesis proposal to an advisory committee consisting of the thesis advisor and one other faculty member in the department. At the same time, register a copy of this proposal in the BCS Undergraduate Program Office (103 Meliora Hall). The thesis proposal should present the background and rationale for the research, explain why the work undertaken is important, and outline the methods used to address the problem and the timeframe estimated to complete the work. The thesis proposal should be reviewed by the advisory committee no later than the end of the fall semester of the senior year. Students wishing to work with an advisor in an affiliated program must obtain prior approval from the department’s Committee on Undergraduate Studies.
- Submit the title of the thesis and endorsing signatures from the advisory committee to the Undergraduate Program Office (103 Meliora Hall) no later than the second week of the semester in which the Senior Seminar is taken. Honors students enroll in the Honors Senior Seminar (BCS 311).
- Prepare a written senior thesis in the form of a scientific journal article and present the thesis orally as part of the Senior Seminar. The written thesis must be submitted to the advisory committee no later than April 15 of the graduating year.
- The thesis is presented formally in a public seminar and then defended at a closed meeting of the students’ advisory committee with an additional faculty member chosen by the departmental chair.

**Related Minors**

**Minor in Psychology as a Natural Science**
See the Department of Clinical and Social Psychology.

**Minor in Visual Science and Research and Minor in Visual Science**
See the Center for Visual Science.

**Minor in Music Cognition and Minor in Music and Linguistics**
See the Music and Sound Initiative.

**Upper-Level Writing Requirement**
Successful completion of a BCS degree will also satisfy the College upper-level writing requirement through significant writing experience at three levels of the curriculum: core courses, laboratory course, and Senior Seminar.

**Courses of Instruction**
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**110. Neural Foundations of Behavior.**
Introduces the structure and organization of the brain, and its role in perception, movement, thinking, and other behavior. Topics include the brain as a special kind of computer, localization of function, effects of brain damage and disorders, differences between human and animal brains, sex differences, perception and control of movement, sleep, regulation of body states and emotions, and development and aging.

**111. Foundations of Cognitive Science.**
Introduces the organization of mental processes underlying cognition and behavior. Topics include perception, language, learning, memory, and intelligence. This course integrates knowledge of cognition generated from the field of cognitive psychology with findings from artificial intelligence and cognitive neuroscience. Students cannot receive credit for both BCS 111 and BCS/PSY 112.
112. **Cognitive Psychology.**

Provides an introduction to basic concepts in modern cognitive psychology. Topics covered include pattern recognition, attention and memory, concepts and categories, language comprehension and production, and higher-level thinking, such as reasoning and decision making. Students cannot receive credit for both BCS 111 and BCS/PSY 112.

151. **Perception and Action.**

Explores how the biology of our senses shapes perceptual experiences of reality. Emphasizes sense of sight primarily and hearing secondarily. An important theme is that our sensory systems play a crucial role in the execution of coordinated movements of our bodies, as we navigate in, and interact with, the environment.

152. **Language and Psycholinguistics.**

Overviews the nature and processing of human languages, including comparisons between language and animal communication systems, the biological bases of human language, and the cognitive mechanisms used in producing, understanding, and learning language.

153. **Cognition.**

Considers human cognitive processes, including behavioral and computational methods used to understand the nature of cognition. Explores how we perceive and integrate sensory information to build a coherent perception of the world; how we memorize and retrieve information; how we reason and solve problems.

172. **Development of Mind and Brain.**

Introduces human development, focusing on the ability to perceive objects and sounds, to think and reason, and to learn and remember language and other significant patterned stimulation. Includes the nature and mechanisms of development in humans and an overview of what is known about brain and behavioral development in other species.

183. **Animal Minds.**

Considers the cognitive and communicative abilities of animals, especially primates, as compared with humans. Topics include thinking, reasoning, remembering, communicating, and understanding number, time, and causality, in animals ranging from ants to apes.

200. **Statistical Analysis and Experimental Design.**

Introduces statistical methods including descriptive statistics (count, central tendency, dispersion), hypothesis testing (significance, t-test, chi-square, etc.) and elements of correlation, regression, and interaction. Emphasis is on what a technique does at a conceptual level, how a technique is reported in the literature, and how to execute a technique. Because of the significant overlap between BCS 200, CSP/PSY 211, STT 211 and STT 212, students may earn degree credit for only one of these courses.

203. **Lab in Neurobiology.**

Introduces the various methods used in neurobiological research. Covers anatomical, behavioral, molecular, and physiological approaches to studying neural organization and function and concludes with a research project that extends over a period of five weeks.

204. **Lab in Cognitive Neuroscience.**

Introduces methods used in cognitive neuroscience, a field that examines cognitive phenomena in terms of their underpinnings in the brain. Covers functional anatomical approaches to studying brain function and dysfunction, behavioral and brain imaging approaches to studying learning and memory, and neuropsychological approaches to understanding sensory, motor, and cognitive processing and disorders.

205. **Lab in Development and Learning.**

Introduces behavioral methods used to study the development of perception, cognition, and language, and provides hands-on experience in the testing of human infants and children. Includes two research projects and a final powerpoint presentation.

208. **Lab in Perception and Cognition.**

Introduces behavioral and psychophysical studies of perceptual and cognitive phenomena. Students perform, analyze, interpret, and report results from experiments that move from reproducing classic phenomena to conducting new studies independently.

220. **The Intelligent Eye.**

Provides an interdisciplinary view of modern research into how the human brain solves the problems involved in perception, including how we perceive the three-dimensional structure of the world, how we recognize objects and how visual information is used to control action in the world. Students read contemporary research and, through classroom discussion and critical essays, explore and analyze the questions and debates that define contemporary perceptual science.

221. **Audition.**

Examines the physiological substrate responsible for hearing. Topics include the physical stimulus for hearing, receptive aspects of speech and language, peripheral physiology (the outer and middle ears, cochlea, and auditory nerve), and central physiology (brainstem nuclei, auditory cortex, descending systems). Introduces electrophysiological techniques used to study auditory function, and explores sensory and perceptual correlates of physiology and sensorineural hearing loss.

223. **Vision and the Eye.**

This course will reveal the intricate optical and neural machinery inside the eye that allows us to see. It will describe the physical and biological processes that set the limits on our perception of patterns of light that vary in luminance and color across space and time. We will compare the human eye with the acute eyes of
predatory birds and the compound eyes of insects. The course will also describe exciting new optical technologies for correcting vision and for imaging the inside of the eye with unprecedented resolution, and how these technologies can help us understand and even cure diseases of the eye.

232. Artificial Intelligence.
Introduces fundamental principles of artificial intelligence, including heuristic search, automated reasoning, handling uncertainty, and machine learning. Presents applications of AI techniques to real-world problems such as understanding the web, computer games, biomedical research, and assistive systems. This course is a prerequisite for advanced AI courses.

233. Statistical Speech and Language Processing.
An introduction to statistical natural language processing and automatic speech recognition techniques. This course presents the theory and practice behind the recently developed language processing technologies that enable applications such as speech-driven dictation systems, document search engines (e.g., finding web pages) and automatic machine translation.

Focuses on how single neurons and populations of neurons represent sensory information, how sensory signals are transformed and decoded to mediate perception, and how perceptual signals are converted into neural commands to initiate actions. Explores how simple behaviors (such as detection and discrimination) can be quantified and explained in terms of neural activity. Investigates neural plasticity with forms of neural plasticity exhibited in adults.

235. Natural Language Processing.
An introduction to natural language processing: constructing computer programs that understand natural language. Topics include parsing, semantic analysis, and knowledge representation.

Introduction to computer vision, including camera models, basic image processing, pattern and object recognition, and elements of human vision. Specific topics include geometric issues, statistical models, Hough transforms, color theory, texture, and optic flow.

240. Basic Neurobiology.
Explores fundamental concepts of neural organization and function. Covers gross and cellular neuroanatomy, neuronal cell biology, the electrophysiology of neurons and synapses, neurochemistry, spinal circuitry, sensory and motor systems, and higher functions including learning and memory.

240P. Basic Neurobiology Lab.
This laboratory is required for students intending to take BCS 203 (NSC 203), including all Neuroscience majors. Students who do not intend to take BCS 203 (NSC 203) are not required to take BCS 240P (NSC 201P).

Examines clinical neuropsychology, which bridges neurology, neuroscience, and clinical psychology. Covers history of clinical neuropsychology, principles of neuropsychological assessment, and the interpretation of cognition and behavior as they relate to brain dysfunction. Considers specific neurological syndromes including neurodegenerative, cerebrovascular, toxic, and memory disorders; epilepsy; head trauma; infectious processes; pediatric neuropsychology; psychiatric syndromes; and forensic neuropsychology. Patient presentations (videotape and in-person interviews) supplement lectures.

Introduces the field of neurochemistry with an emphasis on cellular and molecular neurochemistry. Topics range from study of neurochemical mechanisms that underlie normal neural function to discussion of behavioral disturbances that result from neurochemical abnormalities. Considers neurochemical mechanisms of adaptive behavior, learning and memory, behavioral disorders, gender differences, and drug seeking behavior.

244. Neuroethology.
Explores the neural basis of naturally occurring animal behaviors. Emphasizes how information is integrated from interactions between molecules, cells, and groups of cells, all of which are necessary to produce behavior. Considers how hormones, neural development, anatomy, physiology, and evolution lead to behaviors such as orientation, communication, feeding, and reproduction.

245. Sensory and Motor Neuroscience.
Focuses on how single neurons and populations of neurons represent sensory information, how sensory signals are transformed and decoded to mediate perception, and how perceptual signals are converted into neural commands to initiate actions. Explores how simple behaviors (such as detection and discrimination) can be quantified and explained in terms of neural activity. Introduces students to quantitative approaches for linking neural activity to perception and decision-making. Emphasizes studies of the visual, oculomotor, and somatosensory systems, with some attention to the auditory and vestibular systems as well.

246. Biology of Mental Disorders.
Examines the neurobiology of anxiety/phobic conditions, mood disorders, and chronic psychotic states, particularly schizophrenia. Considers definitions of psychiatric syndromes, the problems of diagnosis, brain organization, and neurotransmitter systems involved in state functions. Introduces research approaches including epidemiologic, phenomenologic, family/adoption, longitudinal descriptive, psychophysiologic, neuropharmacologic, genetic linkage, and postmortem studies; emphasizes recent in vivo brain imaging and neurotransmitter studies.

249. Developmental Neurobiology.
Advanced treatment of the development of the nervous system, including the nature/nurture issue and factors that influence the development of neural organization and function. Topics include the production, migration, differentiation and survival of neurons; functional specialization of neural regions; axonal navigation; target mapping. Compares and contrasts development plasticity with forms of neural plasticity exhibited in adults.
259. Language Development.
Introduces children’s language development, including the acquisition of phonology, syntax, and semantics. 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.

Introduction to the discipline of music cognition. Topics include empirical methods, psychoacoustic principles, influence of Gestalt psychology, music and language, metric and tonal hierarchies, music and the brain, aspects of musical development, and research on musical memory, expectation, and emotion.

261. Language Use and Understanding.
Explores the cognitive mechanisms used to speak and understand language, with a special focus on contextually situated language use. Studies the moment-by-moment processes underlying language production and comprehension, including how speakers choose words and phrases and how listeners understand them.

264. Signed Language Structure.
Prerequisite: knowledge of sign language.
Examines signed languages and the cognitive constraints that shape them, through a detailed consideration of the structure of American Sign Language and other natural signed languages of the world. Includes training in sign language notation and analysis.

265. Language and the Brain.
Examines how the comprehension and production of language is implemented in the human brain. Uses evidence from neuropsychological and brain imaging studies to consider the following questions: What is the network of brain areas that subserves language processing? What are the specific functions of these areas? What happens when these brain areas are damaged? What is the timing of brain activity in these areas during language processing? Finally, how do the brain areas involved in language processing overlap with those involved in other complex cognitive processes?

310. Senior Seminar.
A 2-credit-hour course required of all senior BCS majors who do not enter the honors program. Emphasizes reading, evaluating, and discussing primary research papers. Each student chooses a topic, becomes familiar with it, selects a classic paper, leads a class discussion, and writes an evaluation of the paper as though providing peer review for a journal.

311. Honors Seminar.
A 2-credit course required of seniors in the BCS Honors program. Students choose a classic paper for the class to read, lead a discussion of it, and give a formal oral and written presentation of their honors theses. To be taken in the semester the honors thesis is completed. See BCS 310 and refer to the undergraduate programs coordinator in the Department of Brain and Cognitive Sciences for more information.

390. Supervised Teaching.
391. Independent Study.
392. Practicum.
395. Independent Research.
396. Special Topics in BCS.
Business

Steering Committee for the Major and Minor in Business

Mark Bils, PhD (MIT)
Professor of Economics

Rajiv M. Dewan, PhD (Rochester)
Associate Professor of Electronic Commerce and Computers and Information Systems, William E. Simon Graduate School of Business Administration

Ronald Hansen, PhD (Chicago)
Senior Associate Dean, William E. Simon Graduate School of Business Administration

Michael Wolkofoff, PhD (Michigan)
Senior Lecturer in Economics and Public Policy

A major and a minor in business are available for undergraduate students in the College. Both programs are administered through the Multidisciplinary Studies Center and supervised by faculty committees. Students who wish to enroll in either program should pick up an Approval Form for Majors and Minors in 312 Lattimore Hall and see the authorized advisor in the Multidisciplinary Studies Center.

Goals of the Major

The undergraduate major in business builds on principles of statistics and economics and other social sciences to provide students with an understanding of business-related disciplines such as finance, accounting, marketing, operations management, and organizational theory. The major provides an analytical approach for addressing current as well as future opportunities and problems in either for-profit or not-for-profit organizations. The major also prepares students to pursue graduate work to deepen their preparation in specific disciplines.

The curriculum for the business major consists of a prerequisite in mathematics, a core set of nine courses and a three-course track. The major satisfies the social sciences division of the Rochester Curriculum.

BA in Business

- Prerequisite in mathematics.
- Core set of nine required courses.
- Choice of either Track A or Track B; at least 3 courses from the same track.
- Completion of the upper-level writing requirement. Two courses must be taken for “W” credit.

Prerequisites

In order to be accepted into the business major, students must first satisfactorily complete one year of calculus: MTH 141-143, 161-162, 171-172, or equivalent.

Core Courses (all nine courses required)

One statistics course: ECO 230 or equivalent. STT 213/MTH 203 preferred as they are prerequisites for ECO 231, Econometrics. Also acceptable STT 211, 212, 216, PSY/CSP 211, PSC 200 or 201

ECO 108. Principles of Economics. (If student receives AP or IB credit for ECO 108, one additional economics course is required.)

ECO 207. Intermediate Microeconomics (prerequisite: ECO 108 highly recommended)

ACC 201. Principles of Accounting

ACC 221. Cost Accounting (prerequisite: ACC 201)

FIN 205. Financial Management (prerequisite: ACC 201, ECO 207 or equivalent)

MKT 203. Principles of Marketing (prerequisite: ACC 201, ECO 207 or equivalent)

OMG 201. Operations and Technology Management (prerequisite: knowledge of Excel)

STR 223/ECO 218. Economic Theory of Organization (prerequisite: ECO 207)

Track A or B (complete at least three courses in chosen track)

A. Organizations and Markets

ECO 288/PSC 288. Introduction to Game Theory

ECO 217. Contracts, Organizations, and Markets (prerequisites: calculus and ECO 207)

ECO 274. Market Design (recommended prerequisites: calculus and ECO 288)

ECO 251. Industrial Organization (prerequisite: ECO 207)

STR 223/ECO 223. Pricing Strategy (prerequisite: ECO 207 and MKT 203)

B. Marketing

*MKT 213. Marketing Projects and Cases (prerequisite: MKT 203)

STT 221. Sampling Design (prerequisite: STT 211, 212, 213, 203 or equivalent)

ECO 231. Econometrics (prerequisite: ECO 207, 230, or 213 or MTH 203)

ECO 251. Industrial Organization (prerequisite: ECO 207)

STR 223/ECO 223. Pricing Strategy (prerequisite: ECO 207 and MKT 203)

Minor in Business

This minor is aimed at building core business skills. It contains five courses consisting of three core courses and two electives.

Prerequisites

In order to be accepted into the minor in business, students must first satisfactorily complete both prerequisites (A) and (B).

* Required for Track B
A. One statistics course from the following:
   STT 211. Applied Statistics for the Social Sciences I
   STT 212. Applied Statistics for the Biological and Physical Sciences I
   STT 213. Elements of Probability and Statistics
   STT 216. Applied Statistics II
   ECO 210. Economic Statistics
   MTH/STT 203. Introduction to Mathematical Statistics
   PSY/CSP 211. Introduction to Statistical Methods in Psychology
   PSC 200. Applied Data Analysis
   PSC 201. Political Inquiry

B. ECO 108, Principles of Economics. (ECO 207, Intermediate Microeconomics, can substitute for ECO 108.)

**Core Courses (three courses required)**

ACC 201. Principles of Accounting
MKT 203. Marketing (prerequisites: ACC 201, ECO 207 or equivalent)
FIN 205. Financial Management—for students with ECO 207 and the first semester of calculus (prerequisites: ACC 201, ECO 207 or equivalent) or FIN 204. Principles of Finance—for students without ECO 207, ACC 201, or calculus.

**Electives (two courses required)**

LAW 205. Business Law
OMG 201. Operations and Technology Management (prerequisite: knowledge of Excel)
ACC 221. Cost Accounting (prerequisite: ACC 201)
FIN 206. Investments (prerequisites: FIN 205, MTH 210)
MKT 213. Marketing Projects and Cases (prerequisite: MKT 203)
ECO 211. Money Credit and Banking (prerequisite: ECO 207)
ECO 217. Economics of Contracts Organizations and Markets (prerequisites: ECO 207)
Internship (Independent Studies, either Simon or ECO 394)
PHL 118. Business Ethics
CSP/PSY 264. Industrial and Organizational Psychology
MTH 208. Operations Research (prerequisite: MTH 165)
ENT 227. Entrepreneurship in the Not-for-Profit Environment
ENT 223K. Entrepreneurship to Plan and Grow a Business

Students must meet prerequisites and/or corequisites for individual courses. College rules on overlap apply. (No more than two courses may overlap among the five required courses comprising this minor and a major, or between the five required courses comprising this minor and a separate minor. The prerequisites—ECO 108, 207, and the statistics course are not subject to the overlap policy.)

Students using the business minor to fulfill the social science distribution area requirement must complete, in addition to ECO 108 or 207, a minimum of two additional ECO or CSP courses from the list of electives.

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**Chemistry**

Robert K. Boeckman, Jr., PhD (Brandeis)

Marshall D. Gates, Jr., Professor of Chemistry and Professor of Chemistry; Chair of the Department

Kara L. Bren, PhD (California Institute of Technology)

Professor of Chemistry

Esther Conwell, PhD (Chicago)

Professor (Research) of Chemistry and of Physics

Joseph P. Dinnocenzo, PhD (Cornell)

Professor of Chemistry

Richard S. Eisenberg, PhD (Cornell)

Tracy H. Harris Professor of Chemistry and Professor (Research) of Chemistry

Samir Farid, PhD (Göttingen)

Professor (Research) of Chemistry

James M. Farrar, PhD (Chicago)

Professor of Chemistry

Joshua L. Goodman, PhD (Yale)

Professor of Chemistry

Patrick L. Holland, PhD (California, Berkeley)

Professor of Chemistry

William D. Jones II, PhD (California Institute of Technology)

Charles Frederick Houghton Professor of Chemistry and Professor of Chemistry

Todd D. Krauss, PhD (Cornell)

Professor of Chemistry and of Optics

Thomas R. Krugh, PhD (Pennsylvania State)

Professor of Chemistry

Lewis Rothberg, PhD (Harvard)

Professor of Chemistry, of Chemical Engineering, and of Physics

Wolf-Udo Schröder, PhD (Darmstadt)

Professor of Chemistry and of Physics

Ching W. Tang, PhD (Cornell)

Doris Johns Cherry Professor, Professor of Chemistry, of Chemical Engineering, and of Physics

Douglas H. Turner, PhD (Columbia)

Professor of Chemistry, of Pediatrics, and in the Center for Pediatric Bio-medical Research

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**Associate Professor**

Alison J. Frontier, PhD (Columbia)

Associate Professor of Chemistry

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**Assistant Professor**

Rudi Fasan, PhD (Zurich)

Assistant Professor of Chemistry

David William McCamant, PhD (California, Berkeley)

Assistant Professor of Chemistry

Michael L. Neidig, PhD (Stanford)

Assistant Professor of Chemistry

Bradley L. Nilsson, PhD (Wisconsin)

Assistant Professor of Chemistry

Harry A. Stern, PhD (Columbia)

Assistant Professor of Chemistry

Daniel Weix, PhD (California, Berkeley)

Assistant Professor of Chemistry
The chemist’s view of the atomic and molecular structure involved in the synthesis of complex, naturally occurring molecules. 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 number of our students will find their fascination and aspirations in related or interdisciplinary fields. The aim of the department is 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 131 and CHM 171Q in the fall semester and CHM 132 and CHM 172Q 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 CHM 131/132 sequence is intended for most regular students needing general chemistry. The quest sequence 171Q/172Q is intended for students who have an AP score of 4 or 5 in chemistry and who are prepared to begin organic chemistry as a freshman.

The two sections of CHM 131/132 courses in each semester follow the same basic curriculum. The two CHM 131 sections who are prepared to begin organic chemistry as a freshman.

Organic chemistry is offered with a lecture and a laboratory course each semester. The organic chemistry lectures are CHM 203 in the fall and CHM 204 in the spring. The organic chemistry laboratories are CHM 207 in the fall and CHM 208 or 210 (recommended for majors) in the spring.

The department offers undergraduate programs leading to both BA and BS 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.

BA in Chemistry

The BA degree requires fewer specifications at the advanced level than the BS 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. BA students may elect advanced courses in chemistry and can, thereby, create a curriculum best suited to their individual interests.
**Requirements**

- CHM 131 (General Chemistry) (or equivalent AP credit)
- CHM 171Q/203, 172Q/204, 173Q/207 (Organic Chemistry)
- Three of the following: CHM 132, 211, 251, 252
- Two of the following: CHM 210, 231, 232, 234, 244
- Two additional 200-level or higher chemistry courses or other science courses approved by the Undergraduate Advising Committee (8 credits). 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 or at www.chem.rochester.edu/undergrad
- MTH 161 and 162, or 141, 142, and 143
- MTH 163/165, or a 200-level MTH course, or a course in computer science (CSC 161—or formerly 170, 171) or statistics (STT 201, 211, 212)
- PHY 113–114, or 121–122, or 141–142, or 121 and 114. Students wishing a more rigorous background in physics are advised to take a three-course series, PHY 121–123, or 121 and 142–143
- Additional courses in physics, mathematics, and other sciences such as biology, geology, etc., may be taken as part of the major
- Satisfaction of the Upper-Level Writing Requirement

**BS in Chemistry**

The BS degree is designed primarily for students who anticipate professional careers in chemistry and related science. The degree 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 coursework and a full year of independent research with one of the department faculty. A BS degree that includes a biochemistry course meets all of the requirements for an American Chemical Society–approved degree.

**Requirements**

- Either the series CHM 131, 132, 203, 204, 207, and 210 or the series CHM 151 (or equivalent AP credit), 171Q, 172Q, 173Q 210, and 262 or BIO 250 (Biochemistry), CHM 132, or an approved 200/400-level science course
- CHM 211, 251, and 252
- CHM 231, 232, and 234¹
- CHM 393 (senior research, 8 credits total)³
- 400-level chemistry course⁴
- MTH 140 series or 161, 162, and either 163 or 165 plus one additional course in mathematics (MTH 164 or a 200-level mathematics course), computer science (CSC 161—or formerly 170, 171), or statistics (STT 201, 211, 212)
- PHY 121–123, or 121 and 142–143
- Satisfaction of the Upper-Level Writing Requirement

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

**Regular Sequence**

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<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Fourth Year</th>
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<tr>
<td>CHM 131</td>
<td>CHM 132</td>
<td>CHM 211</td>
<td>CHM 393³</td>
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<td>MTH 161</td>
<td>MTH 162</td>
<td>CHM 203</td>
<td>CHM 392</td>
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<td>CHM 207</td>
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<td>MTH 163/165</td>
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<td>PHY 122</td>
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**Quest Sequence**

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<td>CHM 172Q</td>
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<td>CHM 173Q</td>
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<td>MTH 161</td>
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¹ For students entering in the fall, these are the courses during the first year.
² For students entering in the spring, these are the courses during the second year.
³ Students must take CHM 393 during the fall of their senior year.
⁴ Students must complete at least one additional course in mathematics (MTH 164 or a 200-level mathematics course), computer science (CSC 161—or formerly 170, 171), or statistics (STT 201, 211, 212)
⁵ Students must complete at least one additional course in physics (PHY 140 or a 200-level physics course), or computer science (CSC 161—or formerly 170, 171), or statistics (STT 201, 211, 212)

Fourth Year

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<td>400-level CHM³</td>
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Students who complete CHM 171Q/172Q courses during their first year should consult with a chemistry advisor to plan the remainder of their program.

**Minor in Chemistry**

**Requirements** *(any six courses (4 credits or greater) in chemistry)*

Courses at the 400-level may be included with the permission of the instructor. Prerequisites for advanced courses, such as prior chemistry courses or 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 students' 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 students' goals. Two courses with substantial overlap of content should not be included in a program.

**Upper-Level Writing Requirement**

All chemistry majors are required to complete two upper-level writing courses (“W” courses). At least one of these courses must be a chemistry department course selected from the list below. In each chemistry writing course students are required to submit a total of four writing requirement laboratory reports. Two types of reports are required in each course: one report is written so that a well-educated nonscientist is able to understand the content; the second report is written as a formal scientific presentation with appropriate literature references. The writing requirement may be satisfied in the following courses: CHM 210W, 231W, 232W, 234W, 393W. Students may use one writing course from another department for one of the two required writing courses.

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1. CHM 234 can be replaced by CHM 244 (formerly CHM 245W) or an approved laboratory course in another science department.
2. Eight credit hours of CHM 393 (senior research) are required for a BS degree. Students must prepare a senior research thesis and have the thesis read and approved by the research advisor and a second faculty member in chemistry.
3. Four credits of a 400-level chemistry course may be taken anytime during the junior or senior year.
4. Students must select one course from the following: mathematics (MTH 164 or a 200-level mathematics course), computer science (CSC 161 — formerly 170), or statistics (STT 201, 211, 212).
5. Careful consultation with faculty is necessary to choose an appropriate program. Students are urged to include advanced work in related sciences consistent with their professional aims, such as more mathematics and physics for graduate work in physical chemistry, biology for graduate work in biochemistry, etc.
6. BS chemistry majors who complete CHM 171Q and CHM 172Q must include either CHM 262 or BIO 250 or CHM 132 or an approved 200/400-level science course.

**Double Degree**

**Requirements**

Students who are interested in pursuing a double major or double degree, are advised to consult the College website which outlines the course overlap rules and additional credit requirements. Consultation with a member of the Department of Chemistry’s Undergraduate Advising Committee should take place as early in the planning process as possible.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

100. Preparation for College Chemistry.

*Credit—2 hours*

This course is designed to prepare students with limited backgrounds in science and mathematics for the level of problem-solving skills required in freshman chemistry. It covers aspects of mathematics such as scientific notation and logarithms; atomic structure, including atomic weights and isotopes; stoichiometry, with chemical equations and heats of reactions; solubility, molarity, and normality; gases, including temperature pressure; Boyle’s, Charles’, and ideal gas laws; reaction kinetics, equilibrium; and weak acids and bases. No audits. (Summer)


*Credit—5 hours*

This course is an introduction to the concepts of chemistry for science and engineering students, health professions students, and as a science course for students of the humanities and social sciences. Properties of chemical systems are discussed from a macroscopic and molecular perspective with examples developed from a wide range of disciplines. The topics covered include stoichiometry, atoms and molecules, properties of gases, thermochemistry, chemical equilibrium, acids and bases, solubility equilibria, and oxidation-reduction reactions. In addition to the main lectures each week, there is a three-hour lab (alternate) weeks, a 50 minute lab-lecture, and a 75 minute workshop (M/W/F) or a 75 minute recitation (T/R). Labs are held Mon-Thurs, 1400-1700 and 1730-2030, and Fri 1400-1700. Recitations and workshops are offered at multiple times during the week. In the first week of classes you will be assigned a lab and recitation/workshop section that fits your schedule. (Fall)

132. Chemistry Concepts, Systems, Practice II.

*Credit—5 hours*

A continuation of Chemical Concepts, Systems and Practices I, emphasizing molecular and macroscopic approaches to chemical systems with examples concerned with life sciences (M/W/F) or energy and the environment (T/R). Topics covered include: Chemical kinetics, electrochemistry, thermodynamics, properties of atoms, atomic structure, and chemical bonding. M/W/F: Three 50 minute lectures per week. T/R: Two 75 minute
lectures per week. In addition, for each section there is a three hour laboratory every week, a 50 minute laboratory lecture and a 50 minute recitation or workshop. You must register for the lecture and linked laboratory prior to the start of the semester. The lab-lectures and laboratories are identical for both sections. Recitations/workshops will be assigned in the main lecture during the first week of classes. (Spring)

171Q. Quest Organic Chemistry I.
A one-year exploration of the basic observations, concepts and practice of organic chemistry, with a focus on the fundamental relationships among molecular structure and chemical reactivity. The exploration requires that students grapple Quest issues: defining questions, evaluating evidence, weighing arguments, reflecting on epistemological issues, constructing new experiments, etc. The study of organic chemistry is carefully integrated with a review of the key concepts from general chemistry. Quest Organic is designed for first year students with good preparation in chemistry (e.g., two years of general chemistry and Advanced Placement score 4 or 5, or equivalent preparation). Coregistration in CHM 175Q (laboratory and lab/lecture) required. (Fall)

172Q. Quest Organic Chemistry II.
The second semester of a one-year exploration of the basic observations, concepts and practice of organic chemistry, with a focus on the fundamental relationships among molecular structure and chemical reactivity. The exploration will require that students grapple Quest issues: defining questions, evaluating evidence, weighing arguments, reflecting on epistemological issues, constructing new experiments, etc. The study of organic chemistry will be carefully integrated with a review of the key concepts from general chemistry. Quest Organic is designed for first year students with good preparation in chemistry (two years of general chemistry and an Advanced Placement score of 4 or 5). The accompanying lab for chemistry majors is CHM 210 (2 credits). (Spring)

173Q. Organic Chemistry.
Credit—1 hour
The fall semester laboratory accompanying CHM 171Q. An exploration of the basic observations, concepts and practice of organic chemistry, with a focus on the fundamental relationships among molecular structure and chemical reactivity. The exploration will require that students grapple with Quest issues: defining questions, evaluating evidence, weighing arguments, reflecting on epistemological issues, constructing new experiments, etc. The study of organic chemistry will be carefully integrated with a review of the key concepts from general chemistry. Quest Organic Chemistry is designed for first-year students with good preparation in chemistry (see prerequisites). Co-registration in CHM 171Q (lecture) is required. (Fall)

203. Organic Chemistry.
An introduction to organic chemistry that focuses on chemical bonding, structure and stereochemistry, reactions and reaction mechanisms of organic compounds. There are three 50 minute lectures and one workshop per week. The workshop is an informal, interactive two-hour session in which groups of eight students work on specially designed problems under the guidance of a trained leader. The purpose of the workshop is to provide a mechanism for students to work actively with the material and with each other. Coregistration in the one credit lab CHM 207 is required. (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 and molecules of biological significance. There are three 50 minute lectures and one workshop per week. Coregistration required in the accompanying laboratory course CHM 208 or CHM 210 (2 credit lab recommended for CHM majors). Grade of C- or better in CHM 203 (or equivalent). (Spring)

207. Organic Chemistry I: Lab.
Credit—1 hour
An organic chemistry laboratory course that provides an introduction to the characterization and reactivity of organic molecules using modern laboratory techniques. There is one 3-hour laboratory and one 50 minute laboratory lecture per week. Co-registration in CHM 203 is required. (Fall)

208. Organic Chemistry II: Lab.
Credit—1 hour
A continuation of the laboratory sequence begun in CHM 207 with two components. The one credit laboratory section meets once each week for 2 hours and 40 minutes. In addition, the lecture meets once each week for 50 minutes. Chemistry majors should take CHM 210, a 2 credit laboratory course. (Spring)

Credit—2 hours
A laboratory using advanced, modern experimental techniques. As part of the course, students will be trained to use the department’s NMR spectrometers. This requires extra time outside of scheduled laboratory hours (two, 3-hour laboratories and a lab-lecture per week). This laboratory is required for chemistry majors. Co-registration in CHM 172Q or CHM 204 is required. (Spring)

210W. Organic Chemistry Lab Lecture.
Credit—2 hours
A laboratory using advanced, modern experimental techniques. As part of the course, students will be trained to use the department’s NMR spectrometers. This requires extra time outside of scheduled laboratory hours (two, 3-hour laboratories and a lab-lecture per week). Meets one of the required two upper level writing requirements for a chemistry major. Co-registration in CHM 172Q or CHM 204 is required. (Spring)
211. Inorganic Chemistry I.  
This course covers descriptive chemistry of main group elements, bonding in inorganic systems, coordination chemistry and the properties and reactions of transition metal complexes. Two 75 minute lectures per week. Three 90 minute examinations plus group projects and problem sets. Cross listed with CHM 411. (Fall)

231. Chemical Instrumentation Laboratory.  
This course will provide an understanding of both the method and the application of modern chemical instrumentation to chemical problems and systems. The problems will be deliberately chosen to cover a range of chemical systems. One lecture and two labs per week. One 1-hour exam and a final exam, laboratory work, and written lab reports. Concurrent registration in CHM 251 is recommended. Not open to freshmen and sophomores. (Fall)

231W. Chemical Instrumentation Laboratory.  
This course will provide an understanding of both the method and the application of modern chemical instrumentation to chemical problems and systems. The problems will be deliberately chosen to cover a range of chemical systems. One lecture and two labs per week. One 1-hour exam and a final exam, laboratory work, and written lab reports. Meets one of the two required upper level writing courses for a chemistry major. Concurrent registration in CHM 251 is recommended. Not open to freshmen and sophomores. (Fall)

232. Molecular Spectroscopy Laboratory.  
A thorough study of the principles and practice of spectroscopic methods of modern physical chemistry. This course has three lectures and one lab per week. Two exams and five laboratory reports. (Spring)

232W. Molecular Spectroscopy Laboratory.  
A thorough study of the principles and practice of spectroscopic methods of modern physical chemistry. This course has three lectures and one lab per week. Two exams and five laboratory reports. Meets one of the two required upper level writing courses for chemistry majors. (Spring)

234. Advanced Laboratory Techniques.  
Advanced laboratory techniques of synthesis, characterization, and analysis applied to problems in inorganic and organic chemistry. A laboratory course with two or three 75-minute lectures for each lab. Labs are scheduled either Mon/Wed or Tue/Thur for approximately two-and-one-half hours each. Graded work includes five lab reports, a midterm, and two problem sets. CHM 234W has an additional writing assignment. CHM 234W meets one of the two required upper level writing courses for the chemistry major. (Spring)

234W. Advanced Laboratory Techniques.  
Advanced laboratory techniques of synthesis, characterization, and analysis applied to problems in inorganic and organic chemistry. A laboratory course with two or three 75-minute lectures for each lab. Labs are scheduled either Mon/Wed or Tue/Thur for approximately two-and-one-half hours each. Graded work includes five lab reports, a midterm, and two problem sets. CHM 234W has an additional writing assignment. CHM 234W meets one of the two required upper level writing courses for the chemistry major. (Spring)

244W. Advanced Nuclear Science Educational Laboratory (ANSEL).  
Students enrolled in ANSEL will develop an understanding of our terrestrial radiation environment and some of the important applications of nuclear science and technology. Practical skills in the routine use of radiation detectors, monitors, and electronics. Develop the ability to assess radiation threats and prospects of their abatement. Four in-depth experiments are designed to help create a type of well-rounded, competent experimental nuclear scientist who is able to analyze an experimental problem, select, design, and set up appropriate nuclear instrumentation, and to conduct required measurements. Lab sessions will meet twice a week for two hours and 40 minutes. In addition to the lab component, students will attend a weekly lecture (50 minutes) to discuss the scientific background of the experiments and to relate principles of radiation detection and measurement to modern applications in physics, chemistry, environmental studies, power technology, medicine and forensics. (Formerly CHM 245W.) (Spring)

251. Physical Chemistry I.  
This course is an introduction to quantum mechanics with applications to spectroscopy and to atomic and molecular structure. There are weekly problem sets. Students also participate in workshops each week. Cross listed with CHM 441. (Fall)

252. Physical Chemistry II.  
The course covers thermodynamics, equilibrium, statistical mechanics, solutions, and chemical kinetics. There are three 50-minute lectures and one recitation session per week. Weekly problem sets are assigned. (Spring)

262. Biological Chemistry.  
An introduction to the chemical processes of life. Topics to be covered include proteins and nucleic acids, recombinant DNA technology, biological catalysis, and energy transduction. Structure and function of biological macromolecules will be emphasized. Cross listed with CHM 462. Students will not receive credit for BIO 250 AND CHM 262/462. (Spring)

352. Issues in Workshop Leadership.  
Credit—2 hours (Fall), 1 hour (Spring)

This course prepares students to be effective Workshop leaders in Chemistry courses. Topics include: group dynamics; diversity; student development; learning theory; cognitive apprenticeship; metacognition and constructivism. These ideas are developed
and applied in the context of Workshop practice. Cross-listed as CAS 352 (fall) and CAS 355. The class meets for 1.5 hours each week in the semester in which students are leading workshops. Readings from the research literature, class discussion and a research paper and presentation are required. Cross listed with CAS 352 (fall) and CAS 355. (Spring)

390. Supervised Teaching.*
Supervised teaching as prearranged with chemistry department faculty member. Special application required. Faculty rules restrict students to one 4-credit Independent Studies course per semester.

391. Independent Study.*
Individual study of advanced topics arranged by students. The student and instructor determine what course title is most appropriate. The title, limited to 28 spaces, is listed on the Independent Studies Form. This title will appear on the transcript as the official title of the course. If students do not submit a title, the course title will be determined by the number of the course as listed above. Faculty rules restrict students to one 4-credit Independent Studies course per semester. Special application required.

393. Senior Research Project.*
Independent research directed by faculty member to be arranged during semester preceding registration. Written report and participation in a department poster session required. For BS Chemistry majors, two semesters of CHM 393 are required (8 credits). Special application required.

393W. Senior Research Project.*
Independent research directed by faculty member to be arranged during semester preceding registration. Written report and participation in a department poster session required. For BS Chemistry majors, two semesters of CHM 393 are required (8 credits). Special application required.

395. Independent Research.*
A research course designed by individual arrangement with a faculty member. Plan on spending at least the equivalent of two afternoons (eight hours) a week in the lab. The basis for determining your grade for the research course is worked out between the student and the professor as part of registration for independent research. Special application required.

395W. Independent Research.*
Course is designed by individual arrangement with a faculty member. At least the equivalent of two afternoons (eight hours) a week are spent in the lab. Grade for the research course is worked out between the student and the professor as part of registration for independent research. Special application required.

402. Biophysical Chemistry I.*
An introduction to the theory and practical application of several major techniques used in the structural characterization of biological macromolecules. These methods include: X-ray crystallography, Small Angle X-ray Scattering, Spectroscopic and Calorimetric Techniques, NMR and Comparative Modeling. The goal is to enable non-specialists to become conversant in the language and principles of the field, as well as to understand the strengths and limitations of various techniques. Paper and presentation. (Spring, even years)

404. Biophysical Chemistry II.*
This course 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. Paper and presentation. (Spring, odd years)

405. Interface of Chemistry and Biology.†
This course will provide an introduction to recent research at the interface of chemistry and biology by focusing on seminars given in various departments. Students will read and discuss selected papers from a speaker’s lab during the week before the seminar, attend the seminar, and then meet with the speakers when they visit. Will be CHM 406. (Spring)

411. Inorganic Chemistry I.†
This course covers descriptive chemistry of main group elements, bonding in inorganic systems, coordination chemistry and the properties and reactions of transition metal complexes. Two 75 minute lectures per week. Three 90 minute examinations plus group projects and problem sets. Cross listed with CHM 211.

414. Biophysical Chemistry II.*
Discussion of the role of metal ions in biological systems, especially enzymes. Uptake and regulation of metals, common spectroscopic techniques used for studying metals, and mechanisms through which they react. Other topics include metal ion toxicity, metal-based drugs, and interaction of metals with nucleic acids. Problem sets and proposal.

415. Group Theory.†
Credit—2 hours
Development of symmetry and group theory concepts and scope of applications to chemical problems. Weekly problem sets and a final. (Fall, first half semester.)

416. X-ray Crystallography.*†
Credit—2 hours
Students will learn the basic principles of X-ray diffraction, symmetry, and space groups. Students will also experience the single crystal diffraction experiment, which includes crystal mounting,
data collection, structure solution and refinement, and the reporting of crystallographic data. Weekly assignments: problem sets, simple lab work, or computer work. (Formerly CHM 417.) (Spring, second half semester)

421. Basic Organometallic Chemistry.†
Credit—2 hours
Examination of the concepts, systems, reactions and applications of organometallic chemistry. Structure and bonding of complexes having carbonyl, alkyl, carbene, olefin, CnHn and related pi ligands. Oxidative addition, insertion, elimination reactions, and other fundamental reactions of organometallic compounds. (Fall, second half semester)

422. Organometallic Chemistry.†
Credit—2 hours
Mechanisms in organometallic reactions. Applications of organometallic compounds in homogeneous catalysis, polymerization, metathesis. (Formerly CHM 423.) (Spring, first half of semester)

423. NMR Spectroscopy.†
Credit—2 hours
An introduction to NMR spectroscopy. Collection, processing, and interpretation of homonuclear and heteronuclear 1D and multidimensional spectra will be covered. Topics to be discussed include chemical shifts, relaxation, and exchange phenomena. Examples from organic, inorganic, and biological chemistry will be used. (Formerly CHM 425.) (Fall, first half semester)

425. Physical Methods in Inorganic Chemistry.†
Credit—2 hours
Molecular and electronic structure determination of inorganic compounds and metal complexes: spectroscopic and physical methods. (Formerly CHM 424.) (Fall, second half semester)

427. Organic Structure Determination.†
Credit—2 hours
The modern methods and tools employed for the determination of the structure of complex organic molecules will be discussed. Among the areas discussed are basic NMR, IR, UV and mass spectroscopy. Problem solving techniques will be illustrated and problem solving skills developed by means of problem sets and class examples. (Formerly CHM 426.) (Fall, second half semester)

433. Advanced Physical Organic Chemistry I.†
An understanding of the structure and reactivity of organic compounds by using molecular orbital theory will be provided. Some perspectives on the relationships between structure, mechanism and reactivity will be discussed in the context of a number of fundamental concepts and principles, such as molecular orbital theory, frontier molecular orbital theory, stereochemistry, conformational analysis, stereoelectronic effects, thermodynamics and equilibria, kinetics, linear free-energy relationships, acids and bases catalysis, nonclassical ions, and concerted pericyclic reactions. Not open to freshmen and sophomores. (Fall)

434. Advanced Physical Organic Chemistry II.†
Structure and reactivity; kinetic, catalysis, medium effects, transition state theory, kinetic isotope effects, photochemistry, reactive intermediates, and mechanisms. Readings in text ("Determination of Organic Reaction Mechanisms," B.K. Carpenter); Problem sets (about four during the semester). Two 75 minute lectures per week. (Spring)

435. Organic Reactions.†
A survey of reactions of organic compounds with emphasis on those with practical synthetic utility will be provided. Mechanisms of reactions will be considered as well as their scope and limitations. Stereochemical and stereoelectronic issues will be discussed. Selected topics to be covered are conformational analysis, olefin addition reactions, oxidation and reduction methods, pericyclic reactions, chemistry of enolates and metalloenamines, organosilicon chemistry, chemistry of nitrogen- and sulfur-based functional groups, chemistry of reactive intermediates, such as carbocations and carbenes. A solid background of college organic chemistry, including a good knowledge of reaction mechanisms, will be assumed as a prerequisite. Two 75 minute lectures per week with extensive reading assignments from original literature. (Fall)

436. Organometallic Chemistry for Organic Synthesis.†
Credit—2 hours
The transition metal mediated organometallic reactions most commonly employed in organic synthesis will be discussed including their substrate scope, mechanism, and stereo- and/or regiochemical course. Emphasis will be placed on the practical aspects such as catalyst and reaction condition selection, and protocols for trouble shooting catalytic cycles. (Spring, first half semester)

438. Synthetic Design: Strategy and Tactics.†
Credit—2 hours
A formalism describing commonly employed strategies and tactics for the analysis of complex problems in organic synthesis will be presented. Examples of such strategies will be compared and contrasted during discussion of published complex molecule syntheses. Two, 75 minute lectures per week. (Spring, second half semester)

440. Bioorganic Chemistry.†
An introduction to bioorganic chemistry and chemical biology. The course will present a survey of how the principles of organic chemistry have been applied to understand and exploit biological phenomena and address fundamental questions in life sciences. The course is primarily based upon the primary

* Taken with consent of the instructor.
† Offered in alternate years
literature. Covered topics include the design and mechanism of enzyme mimics and small molecule catalysts (organocatalysts), synthesis and chemical modification of biomolecules (oligonucleotides, proteins, oligosaccharides), design and application of oligonucleotide and peptide mimetics, and chemical approaches to proteomic and genetic analyses. Not open to freshmen and sophomores. (Formerly CHM 437.)

441. Physical Chemistry I.*
This course is an introduction to quantum mechanics with applications to spectroscopy and to atomic and molecular structure. There are weekly problem sets. Students also participate in workshops each week. Cross listed with CHM 251. (Fall)

444W. Advanced Nuclear Science Educational Laboratory (ANSEL).*
Students enrolled in ANSEL will develop an understanding of our terrestrial radiation environment and some of the important applications of nuclear science and technology. Practical skills in the routine use of radiation detectors, monitors, and electronics. Develop the ability to assess radiation threats and prospects of their abatement. Four in-depth experiments are designed to help create a type of well-rounded, competent experimental nuclear scientist who is able to analyze an experimental problem, select, design, and set up appropriate nuclear instrumentation, and to conduct required measurements. Lab sessions will meet twice a week for two hours and 40 minutes. In addition to the lab component, students will attend a weekly lecture (50 minutes) to discuss the scientific background of the experiments and to relate principles of radiation detection and measurement to modern applications in physics, chemistry, environmental studies, power technology, medicine and forensics. (Formerly CHM 245 W.) (Fall)

451. Quantum Chemistry I.*
Basic quantum chemistry, Schroedinger equation, basic postulates of quantum mechanics, angular momentum, perturbation theory, and molecular structure. (Fall)

452. Quantum Chemistry II.*
The goal of this course is to give you sufficient background and familiarity with the basic concepts of Quantum Mechanics as it is applied in Chemistry. While CHM 451 focused on relatively simple exactly solvable problems that let you build the foundations of quantum chemistry, CHM 452 will deal with chemical spectroscopy and approximate methods that are applicable to generic chemical systems.

455. Thermodynamics and Statistical Mechanics.*
The course draws connections between the orderly and chaotic behavior of simple and complex systems, laying the foundations of statistical equilibrium and equilibrium thermodynamics. The different phases of matter (gases, liquids, solid) assumed by bulk classical interacting particles and their transitions are discussed in this approximation. Properties of non-interacting quantal systems are expressed in terms of partition functions, for gases of simple and complex particles. Non-equilibrium statistical behavior of multi-particle systems leads to diffusion and other transport phenomena. Reading assignments and homework. Two weekly lectures of 75 minutes. Cross listed with CHE 455. (Fall)

An introduction to the electronic structure of extended materials systems from both a chemical bonding and a condensed matter physics perspective. The course will discuss materials of all length scales from individual molecules to macroscopic three-dimensional crystals, but will focus on zero, one, and two-dimensional inorganic materials at the nanometer scale. Specific topics include semiconductor nanocrystals, quantum wires, carbon nanotubes, and conjugated polymers. Two weekly lectures of 75 minutes each. Cross listed with OPT 456. (Spring)

458. Molecular Spectroscopy.*
Credit—2 hours
This course covers the basic theory and experimental practice of spectroscopy in molecules and condensed matter. A general review of electromagnetic waves is followed by time dependent perturbation theory and a density matrix treatment of two-level systems. The basic principles are applied electronic, vibrational and rotational spectroscopy. The course draws heavily on literature studies that exemplify the material.

460. Chemical Kinetics.*
Credit—2 hours
Within the broad area of chemical kinetics, this course will focus on basic concepts of kinetics, photochemistry and electron-transfer (eT). In addition to studying bulk reaction rates, we will discuss Marcus’s theory of eT, intramolecular vibrational energy redistribution (IVR) and vibrational cooling, and the fates of photoexcited species (radiative and non-radiative decay channels). We will address the experimental quantification of these kinetics using time-resolved spectroscopy and analysis of kinetic data. The course material will be somewhat continuous with that of CHM 458, Molecular Spectroscopy. (Spring, second half semester)

462. Biological Chemistry.*
An introduction to the chemical processes of life. Topics to be covered include proteins and nucleic acids, recombinant DNA technology, biological catalysis, and energy transduction. Structure and function of biological macromolecules will be emphasized. Cross listed with CHM 262. Students will not receive credit for BIO 250 AND CHM 262/462. (Spring)

465. Nuclear Science and Technology I.*
Nuclear technologies of measurement, accelerators and radiation detection, effects and applications of radiation. Fundamental particles interactions, quark model. Nuclear masses, sizes, and

* Taken with consent of the instructor.
shapes. Overview of microscopic and macroscopic models of the nucleus. Nuclear radioactivity and decay modes. Introduction to nuclear reaction theory, classical potential scattering, semi-classical and quantal models of scattering, nuclear excitation, and mass transfer. Mathcad computer projects. Two 75 minute lectures per week, home work problems, and computer simulations. Formerly CHM 466. (Fall)

470. Computational Chemistry. *

In this course students will learn about a range of computational methods used to attack research problems in chemistry. Emphasis will be placed both on the theory underlying computational techniques and on their practical application. Topics will include molecular mechanics, ab initio electronic structure theory, density functional theory, molecular dynamics and Monte Carlo simulations, methods for free-energy calculations, path-integral techniques, and methods for protein structure prediction. Weekly two to three computer labs and problem sets. (Spring)

Clinical and Social Sciences in Psychology

Professor

Patrick Davies, PhD (West Virginia)
Professor of Psychology

Edward L. Deci, PhD (Carnegie Mellon)
Helen F. and Fred H. Gowen Professor in the Social Sciences and Professor of Psychology

Andrew Elliot, PhD (Wisconsin, Madison)
Professor of Psychology

Rafael Klorman, PhD (Wisconsin, Madison)
Professor of Psychology and of Brain and Cognitive Sciences

Dale W. McAdam, PhD (Iowa)
Professor of Psychology

Harry Reis, PhD (NYU)
Professor of Psychology and of Psychiatry

Richard Ryan, PhD (Rochester)
Professor of Psychology, of Psychiatry, and of Education

Judith Smetana, PhD (California, Santa Cruz)
Professor of Psychology

Miron Zuckerman, PhD (Harvard)
Professor of Psychology

Associate Professor

Sheree Toth, PhD (Case Western Reserve)
Associate Professor of Psychology

Ronald D. Rogge, PhD (California, Los Angeles)
Associate Professor of Psychology

Loisa Bennetto, PhD (Denver)
Associate Professor of Psychology and of Brain and Cognitive Sciences

Assistant Professor

Mandi L. Burnette, PhD (Virginia)
Assistant Professor of Psychology

Melissa L. Sturge-Apple, PhD (Notre Dame)
Assistant Professor of Psychology

The department uses teaching assistants in laboratories and as discussion group leaders in large courses.

The Department of Clinical and Social Sciences in Psychology offers programs of study leading to a bachelor’s degree in psychology and PhD degrees in clinical psychology, social-personality psychology, and developmental psychology. The department also offers several minors and clusters in the social sciences. The department offers instruction in a wide variety of topics, including social psychology, clinical psychology, personality, motivation, and social and emotional development. In all of these areas, courses are offered at a broad entry level and also at a more specific advanced level. Parallel to the content-oriented courses, a series of courses on research methodology and statistics is also offered. Here the intent is to introduce the student to the research tools with which psychologists acquire their

* Taken with consent of the instructor.
knowledge because how the research is done can often shed light on what the research has found.

In addition to the standard course offerings, students may pursue their research interests through independent study courses that are offered by individual faculty. These courses offer an opportunity to work closely with a researcher on an ongoing project. For many students, an independent study course is the first step along the path that leads to the honors program. Students can also gain practical experience and earn course credit through various internships. These special offerings are particularly aimed at students intending to pursue graduate degrees in psychology, but other interested students are not excluded. Undergraduates can also register for graduate-level courses with the permission of the advisor and the course instructor.

Programs in psychology, including the major, the minors, and the CSSP clusters, are administered by the Department of Clinical and Social Sciences in Psychology (CSSP). Courses in psychology—designated PSY courses—are offered by CSSP and by BCS (the Department of Brain and Cognitive Sciences), and most PSY courses carry cross-listings as either CSP or BCS courses.

Instruction is offered throughout the broad spectrum of behavioral science. Its content covers theoretical, empirical, and technical presentations of psychology as both a social and natural science. Applications to health and helping professions and to business are common themes. Student experiences may range from large lecture courses with smaller discussion sections to individual laboratory, practicum, and internship situations. Undergraduates may register for graduate-level courses with permission of the instructor. Programs may be tailored to provide excellent background for postgraduate work in psychology, medicine, education, social work, law, business, and other related social and natural sciences as well as to occupations in business and human services.

Students planning to pursue graduate studies in psychology are advised to seek a broad foundation in psychology, an informed depth in their field of interest, and a working focus on the research literature and research methodologies. These students are also encouraged to take active roles in the ongoing research of faculty, the Undergraduate Psychology Council, and the local chapter of Psi Chi, the national honorary society in psychology.

General Course Information

An Introduction to Psychology course is a prerequisite for declaring the major and a requirement in the minors in psychology. It may be waived for students who receive a score of 3 or higher on the Advanced Placement psychology examination. A score of 4 or 5 on that examination will earn college credit for PSY 101. There is also a placement examination offered through the College Center for Academic Support. PSY 101 as a prerequisite or requirement is waived upon passing this exam.

Students taking psychology courses as part of a psychology degree should register for those courses under PSY.

Introductory Course

PSY 101, Introduction to Psychology, is a balanced and integrated survey of psychology with coverage of both social and natural science domains. Sections of PSY 101 vary, but most consist of lectures, readings, discussions, and demonstrations. One fall section is limited to freshmen only. (Fall and Spring)

Core Courses

Core courses in psychology present surveys of their specific areas. They enter into the requirements for the major and the minors in psychology. The current core courses are

PSY 110. Neural Foundations of Behavior
PSY 112. Cognitive Psychology
PSY 113. Biopsychology of Social and Clinical Behaviors
PSY 161. Social Psychology and Individual Differences
PSY 171. Social and Emotional Development
PSY 181. Theories of Personality and Psychotherapy

BA in Psychology

This major partially fulfills requirements for the BA degree.

- PSY 101 or the equivalent must be completed before the student is accepted into the major.
- An acceptable statistics course, preferably by the end of the sophomore year. PSY 200, 211, STT 211, 212, or 213 is strongly recommended, although STT 203 may also be used to meet this requirement.
- In addition to the above, at least 10 courses comprising the following:
  - Two of the three core courses in natural science aspects of psychology: PSY 110, 112, and 113. BCS 111 may be substituted for BCS/PSY 112.
  - Two of the three core courses offered in social science aspects of psychology: PSY 161, 171, and 181
  - Four further PSY courses, NOT including independent studies or Quest courses
  - Two more courses, including independent studies in psychology. These may be PSY courses, or they may be courses in an allied field that inform the students’ pursuit of psychology. Allied field courses are frequently bridges to students’ second major or a minor. At the time of declaring the major, students should be prepared to argue for the appropriateness of the allied field choices.

- Two of the psychology courses must be designated upper-level writing courses and one of these must be at or beyond the 200 level.
- Pursuant to College rules, all courses in the major must be completed with a cumulative average of 2.0 (C) or better.

As many as two psychology courses in addition to the introduction and statistics courses may be transferred into the major from other institutions. Transferred courses into the major must be explicitly approved.
Honors in Psychology

Students should form the intention and plan to enter the honors program by the first semester of their junior year or before. Success in this program requires commitment to a working engagement with research in psychology. Students in the honors program should secure a faculty mentor early on in their pursuit of the degree. Most students in the honors program intend to pursue graduate study in psychology, and the program is tailored to their preparation for that goal.

Requirements

- Completion of the requirements for the major in psychology and for the honors degree
- A cumulative grade point average of 3.3 or better in psychology courses by the beginning of the senior year
- The students’ program must include
  - PSY 219W, Research Methods in Psychology, or other formal laboratory course
  - one 300-level or higher course in psychology
  - PSY 309, Honors Research Seminar, or, if this course is not available, either a second upper-level seminar in psychology or an independent study in psychology
  - PSY 310, Honors Research I, and PSY 311, Honors Research II
  - completion of acceptable senior thesis

Minor in Clinical Psychology

- PSY 101, Introduction to Psychology, or its equivalent is required for all minors. Declaration of a minor should be done with a CSSP faculty advisor. A student may complete only one minor in psychology, and may not do both the major and a minor in psychology.
- Four courses in addition to PSY 101

Undergraduate Organizations

Undergraduate Psychology Council

The Undergraduate Psychology Council is open to all students interested in psychology. The council organizes or contributes to a number of events each year, such as independent study fairs, graduate study interest meetings, faculty/student social hours, the honors thesis colloquium, and the psychology diploma ceremony.

Psi Chi

Psi Chi, the National Honor Society in Psychology, is open to majors or minors who meet Psi Chi’s academic requirements.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

All courses for undergraduates are cross-listed as CSP and PSY.

CORE COURSES

101. Introduction to Psychology.

Is a balanced and integrated survey of psychology with coverage of both social and natural science domains. Sections of PSY 101 vary, but most consist of lectures, readings, discussions, and demonstrations. One Fall section is limited to Freshmen only.


An exploration of biological explanations of topics in social and clinical psychology, e.g., emotions, sexuality, psychopathology, and addictions.


Introduction to field of social psychology and overview of research on individual differences in personality. Topics include: the self, attributions, social cognition, interpersonal attraction, relationships, helping, social influence, traits, and motive dispositions. Students complete and receive personal feedback on a number of personality measures.

171. Social and Emotional Development.

An examination of the interpersonal, emotional, cognitive, and environmental factors that influence children’s social and emotional development from early infancy through late adolescence.

181. Theories of Personality and Psychotherapy.

A survey of personality, emphasizing modern theoretical approaches, basic methods of investigation, and the relations of these theories to psychotherapy and behavioral change.

RESEARCH METHODOLOGY AND LABORATORY OR PRACTICUM COURSES

211. Introduction to Statistical Methods in Psychology.

Introduction to the use of statistics in psychological research. Topics include descriptive statistics, correlation and regression, and inferential statistics. Examples are drawn from social and personality psychology. Logic of statistical inference and proper interpretation of research findings are emphasized. (Fall and Spring)

Please note that, because of the significant overlap between them, students may earn degree credit for only one of these courses: BCS 200, CSP/PSY 211, STT 211 and STT 212.
219W. Research Methods in Psychology.
An introduction to the basic concepts, logic, and procedures needed to do psychological research. Hands-on experience with all major phases of the research process is provided, including: surveying the existing literature, developing research hypotheses, collecting and analyzing data, and reporting the results in manuscript form.

266. Research Laboratory in Social Psychology.

351. Research in Development Neuropsychology.
This course provides guided, direct research experiences in developmental neuropsychology, with a particular focus on autism and other developmental disabilities.

352. Research in Developmental Neuropsychology.
This course provides guided, direct research experiences in developmental neuropsychology, with a particular focus on autism and other developmental disabilities.

356. Research in Adolescent Development.
This course provides guided, direct experiences with research on adolescent development, with a particular focus on adolescence in the contest of family relationships.

373. Exploring Research in Social Psychology I.
First-hand team experience with ongoing research in social psychology areas.

374. Exploring Research in Social Psychology II.
First-hand team experience with ongoing research in social psychology areas.

377. Exploring Research in Family Psychology I.
Provides guided, direct, research experiences in investigating the interplay between family relationships and children's social and emotional development. Emphasis is placed on gaining knowledge in translating theories (e.g., family systems theory) into empirically testable hypotheses and designing research methods and techniques to test predictions.

378. Exploring Research in Family Psychology II.
Provides guided, direct, research experiences in investigating the interplay between family relationships and children's social and emotional development. Emphasis is placed on gaining knowledge in translating theories (e.g., family systems theory) into empirically testable hypotheses and designing research methods and techniques to test predictions.

384. Practicum in Developmental Disabilities.
Explores educational, therapeutic, and social challenges in developmental disabilities. Students spend approximately eight hours per week in a supervised educational or treatment setting as well as participate in weekly meetings to review and discuss general issues in the field.

385. Practicum in Developmental Disabilities.
Explores educational, therapeutic, and social challenges in developmental disabilities. Students will spend approximately 8 hours per week in a supervised educational or treatment setting as well as participate in weekly meetings to review and discuss general issues in the field.

388. Research Practices in Developmental Psychopathology I.
Experience in conducting research in the area of developmental psychopathology involving patterns of development in high-risk children.

389. Research Practices in Developmental Psychopathology II.
A continuation of CSP 388.

390. Supervised Teaching.

391. Independent Study.

392. Practicum.

394. Internship.

SPECIAL COURSES INCLUDING HONORS COURSES

310W. Honors Research.
Development and conduct of research leading to the Honors Thesis.

311. Honors Research.
Development and conduct of research leading to the Honors Thesis.

LECTURE COURSES

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.

263. Relationship Process and Emotions.
Relationships are among the most important endeavors of human activity. In the past three decades, extensive theory and research has been devoted to understanding the processes that regulate thoughts, feelings, and behavior in meaningful relationships with friends, family, and romantic partners. We will review scientific research on important topics such as attraction, attachment, emotion, intimacy, conflict resolution, relationship development and deterioration, and the impact of relationships on physical health and emotional well-being.

264. Industrial and Organizational Psychology.
Applications of psychological theory and research to work settings. Topics include personnel selection, training and appraisal;
organizational structure and transformation; performance in work groups; motivation and satisfaction; leadership; work conditions; and cross-cultural issues.

267. Psychology of Gender.
Exploration of the ways males and females differ in interaction, theories of development of sex differences, consequences for social change.

276. Psychology of Parenting.
Parenting and family life are emphasized from developmental, ecological, and cross-cultural perspectives. Caregiving in diverse family forms and cultures is studied in relation to adult-child interactions, parent/school/community relations, family roles, laws, and parenting skills. Issues related to aspects of diversity in contemporary families are included.

278. Adolescent Development.
This course surveys theory and research relating to normal development during adolescence. Adolescent development is examined in a variety of contexts, including families, peer groups, and schools, and issues pertaining to biological, social, and cognitive development are discussed.

280. Clinical Psychology.
An introduction to the field of clinical psychology. Students are exposed to prevalent theoretical and research models, as well as approaches and research findings to assessment and diagnosis, and treatment modalities.

281. Psychology and the Law.
This course provides an introduction and overview to the intersection between psychology and the legal system. Topics will include: forensic assessment, expert testimony, children and adolescents and the legal system, and the application of psychological science to legal issues.

282. Abnormal Psychology.
This course provides a conceptual overview to the field of psychopathology. We will discuss assessment and diagnosis, etiology, developmental course, treatment, and prognosis of the major psychological disorders. Current theory and research will be emphasized.

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.

Presents theory, research, assessment, and intervention in child and adolescent psychological disorder. Contributions of the normal developmental perspective to understanding psychopathology and risk, and vice versa, are emphasized.

SEMINAR COURSES

301W. Teaching Psychology.
In-depth consideration of topics in psychology and their communication. PSY 101 is a lab for this course.

364. Achievement and Motivation.
Seminar on achievement motivation, including achievement motives, achievement goals, and the strategies individuals use in achievement settings.

Determinants and consequences of the need for control and perceived control, and their relation to individual and social behavior.

368W. Seminar in Humanistic Psychology.
An introduction to the theory and methods of humanistic psychology with particular emphasis on humanistic approaches to psychotherapy and growth. The approach is learning through experience. The class employs the methods of humanistic psychology, including demonstrations and experimentation. Assignments include regular reading and writing. Writings require the applications of theory to one's own life experiences. This is an upper-level writing course for all participants.

Guided by a family systems perspective, this seminar explores children's social and emotional development within contexts of parent-child, interparental, and sibling relationships. Designed for advanced undergraduate students, the course primarily covers research findings and theories and requires research proposal writing and class presentations.

375. Advanced Topics: Relationships and Emotions.
This seminar reviews theory and research in the social psychology of relationships and emotions. Topics include attraction, theories of social interaction, relationship maintenance processes, emotional expression in relationships, and emotion regulation. Class format will be discussion of published empirical studies and theories. Evaluation will be based on written assignments, class participation, and an oral presentation. Students who enroll for the course should be comfortable reading empirical articles from the psychological literature. Content of this course is intended to build on CSP/PSY 263.

376. Seminar in Self-Determination.
Deals with the field of human motivation with particular emphasis on intrinsic motivation and the meaning of self-determination in human functioning. A theoretically oriented course that reviews a range of research projects.
381. Psychology of Developmental Disabilities.

This course provides an introduction to the unique characteristics and challenges of individuals with developmental disabilities across the lifespan. We address the main concepts and issues involved in the identification, treatment, education, and support of children and adults with mental retardation and other developmental disabilities. We also explore current beliefs about intelligence, historical trends in society’s perspectives on disabilities, and legal and ethical considerations. The class format includes both lecture and discussion.

383. Moral Development.

This seminar focuses on the psychological study of moral development. Different theoretical approaches to morality and related empirical research are discussed. The primary focus is from a developmental psychology perspective, but philosophical and educational issues also are considered.

386. Advanced Emotional Development.

Examines normative growth and individual differences in emotional development from birth through adolescence. Within each major developmental period, advances in the expression, regulation, and understanding of emotions is explored. The effects of culture and socialization practices on emotional development is emphasized.


Consideration of recent experimental and theoretical contributions in several selected areas of psychology.

Dance

Missy Pfohl Smith
Director of the Program
Debra Corea
Instructor
Kathy Diehl
Instructor
David Ferreira
Instructor
Danielle Fraenkel
Instructor
Robert Loughridge
Instructor
Karen I. Martino
Instructor
Jacki McCausland
Instructor
Nancy J. Pigno,
Instructor
Todd J. Russell
Instructor
Katrina L. Scott
Instructor
Courtney B. World
Instructor

The Program of Dance and Movement at the University of Rochester is a unique program that currently offers students a minor in dance, a minor in movement studies, four options for a cluster: Dance and Performance; Improvisation and Creative Process; Movement and Culture; and Mind-Body Somatics, as well as a wide variety of elective course options. These options are part of a commitment to offer experiential and theoretical study of dance and movement that honors and informs the whole student. The program emphasizes dance as an art form, a creative process and creative thinking, self-awareness, contemplative practice, the nature of community, diversity, and an appreciation of diverse ways of thinking and moving. It explores the use of dance and movement as a means of creative and personal expression; as mindful, physical, and spiritual practice; and as a way of understanding culture, traditions, and philosophies from all over the world.

The program seeks to encourage embodied knowledge of culture, dance, and movement forms. Dance appreciation, movement for health, and connectedness of body and mind are at the heart of the program. It is important that students recognize dance and movement studies as scholarly endeavors. Regardless of the students’ career path, study in the program helps foster educated audiences and participants in the diverse field of dance and movement in culture.

The program sponsors the Performing Artist Series, which features performances, lecture-demonstrations, and workshops by internationally and nationally acclaimed artists and educators, who share their passion for the arts with the University and the surrounding community. The focus of the series is to encourage discussion, stimulate the imagination, provide bridges
between artistic and other disciplines, and to foster a learning environment composed of students, faculty, staff, and community. Together, the academic and cocurricular components of the Program of Dance and Movement also give a foundation for ongoing learning and creative responsiveness throughout life.

Clusters

The Program of Dance and Movement offers four clusters; each provides an in-depth view of a different area. For more information on the clusters, visit the program’s website at www.rochester.edu/college/dance.

- Improvisation and Creative Process
- Movement and Culture
- Mind-Body Somatics
- Dance and Performance

 Minor in Dance

The minor in dance consists of a minimum of 26 credits. No more than two courses included in the major may be counted toward the minor. A required student Performance Component is included in DAN 278 and/or DAN 385 and at least two courses need to be taken at the Intermediate or Advanced level.

The minor develops skills in observation, analysis, and critical response to dance as an art form and as a component of life and culture. The Program of Dance and Movement is not merely for the sake of fitness or memorizing steps, but is based on the results of theoretically based movement explorations and more. Ultimately, dance literacy and appreciation along with the potential for participation in and/or an understanding of a dance-related career, including but not limited to performance, teaching, arts management, choreography, criticism, and production design, are at the heart of the program. Regardless of students’ career path, a minor in dance helps foster educated audiences and participants in the diverse field of dance in culture.

The categories of courses are arranged into four areas:

- **Core Context Courses**: Choose at least two (8 credits):
  - DAN 250. Contemporary Dance: Context and Practice (4 credits). (Fall or Spring)
  - DAN 251. Intermediate/Advanced Jazz Dance: Context and Practice (4 credits). (Every other year)
  - DAN 252. Intermediate Ballet: Context and Practice (4 credits). (Every other year)
  - DAN 101. World Dance (4 credits). (Fall or Spring)
  - DAN 204. Contact Improvisation and Culture (4 credits). (Fall or Spring)

- **Creative Expression Courses**: Choose at least 4 credits:
  - DAN 278. Choreography (4 credits). (Fall or Spring)
  - or
  - DAN 104. Contact Improvisation (2 credits)
  - and
  - DAN 385. Dance Performance Workshop (2 credits)

- **Somatic Awareness Courses**: Choose at least one, but no more than two, from the following (2 credits):
  - DAN 114. Introduction to Anusara Yoga (2 credits)
  - DAN 208. Tai Chi: Movement Art and Culture (2 credits)
  - DAN 209. Qi Gong: Chinese Way to Health (2 credits)
  - DAN 216. Yoga and Experiential Anatomy (2 credits)
  - DAN 225. Anusara Yoga II (2 credits)

- **Styles Courses**: Choose from the following or from any Core Context or Creative Expression courses above that have not yet been taken to total 26 credits:
  - DAN 116. Introduction to Contemporary Ballet (2 credits)
  - DAN 110. Beginning Dance Techniques (2 credits)
  - DAN 268. Intermediate/Advanced Contemporary Ballet (2 credits)
  - DAN 213. Jazz Dance (2 credits)
  - DAN 265. Contemporary Dance Technique ((2 credits)
  - DAN 102. Fundamentals of Movement (2 credits)
  - DAN 180. Creative Middle Eastern Dance (2 credits)
  - DAN 190. Middle Eastern Dance: Folkloric/Bedouin (2 credits)
DAN 230. Intermediate Rhythm Tap (2 credits)
DAN 181. West African Dance Forms I (2 credits)
DAN 281. West African Dance Forms II (2 credits)
DAN 284. African Dance: Women and Culture (2 credits)
DAN 171. Capoeira: Brazilian Art Movement (2 credits)
DAN 271. Capoeira II: Music in Motion (2 credits)
DAN 230. Yoga and Living Anatomy (4 credits)
DAN 105. Creative Improvisation through World Percussion (2 credits)

Minor in Movement Studies

The minor in movement studies consists of a minimum of 26 credits. No more than two courses included in the major may be counted toward the minor.

The minor in movement studies emphasizes contemplative practice, the nature of community, diversity, and an appreciation of diverse and creative ways of thinking and moving. At the core of the goals for the movement studies minor is embodiment of self-awareness, knowledge of culture through movement and dance, and movement studies as a practice for lifelong health and stress management. Classes and faculty promote a sense of community within which discussions and experiential study take place focusing on a number of issues surrounding cultural identity, movement practices across cultures, internal practices for self-discovery and creative expression, body image, centered alignment, body conditioning, and philosophies for mindfulness are some of the topics investigated in this minor. The dances and movement practices of any given culture also shed light on the sociology, philosophy, politics, and relationships among people within that culture.

The categories of courses are arranged into four areas:

- **Core Context** courses give a framework for movement studies as a means to self-awareness and as an integral component of culture. These 4-credit courses consist of a combination of experiential and/or technical practice rooted in theory and/or culture along with lecture and video-based instruction that shares past history and current practices in the specified forms.

- **Fundamentals** courses provide a foundation for technique and improvisation and are based on experiential anatomy and developmental movement patterns that lead to a deeper understanding of coordination and total body integration for dance, sports, fitness, and life.

- **Dance Appreciation** courses give students an opportunity to develop skills for expressing their own artistic and aesthetic voices in order to improvise, create dances of their own, and think outside of the box. They also provide a performance experience as well as developing their observation and analytical skills for dance, art in general, and composition.

- **Movement Studies** courses are designed to encourage a diverse approach to a depth of understanding of embodiment. These courses serve as valuable training for relaxed strength, total body coordination/organization, integration of breath support, balance, centered alignment, timing, weight shifting, mindfulness, and fluidity.

**Core Context**
Choose at least two (8 credits):
DAN 211. T’ai Chi: Explorations in Qi (4 credits). (Fall or Spring)
DAN 230. Yoga and Living Anatomy (4 credits). (Summer)
DAN 250. Contemporary Dance: Context and Practice (4 credits). (Fall or Spring)
DAN 204. Contact Improvisation and Culture (4 credits). (Fall or Spring)
DAN 101. World Dance (4 credits). (Fall or Spring)

**Fundamentals**
Required (2 credits);
- DAN 102. Fundamentals of Movement (2 credits)

**Dance Appreciation**
Choose at least two but no more than three (4–6 credits):
DAN 104. Contact Improvisation (2 credits)
DAN 116. Introduction to Contemporary Ballet (2 credits)
DAN 110. Beginning Dance Techniques (2 credits)
DAN 268. Intermediate/Advanced Contemporary Ballet (2 credits)
DAN 213. Jazz Dance (2 credits)
DAN 180. Creative Middle Eastern Dance (2 credits)
DAN 190. Middle Eastern Dance: Folkloric/Bedouin (2 credits)
DAN 181. West African Dance Forms I (2 credits)
DAN 281. West African Dance Forms II (2 credits)
DAN 171. Capoeira: Brazilian Art Movement (2 credits)

**Movement Studies**
Choose from the following or from any Core Context courses above that have not yet been taken to total 26 credits:
DAN 114. Intro to Anusara Yoga (2 credits)
DAN 208. Tai Chi: Movement Art and Culture (2 credits)
DAN 209. Qi Gong: Chinese Way to Health (2 credits)
DAN 216. Yoga and Experiential Anatomy (2 credits)
DAN 220. Sacred Dance and Yoga (2 credits)
DAN 225. Anusara Yoga II (2 credits)
DAN 265. Contemporary Dance Technique (2 credits)
DAN 271. Capoeira II: Music in Motion (2 credits)
DAN 105. Creative Improvisation through World Percussion (2 credits)
Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

101. World Dance: Movement as Culture.
Exploration of world cultures through dance. Dance literacy through movement and embodied dance history. Investigates historical and anthropological significance of dance as well as provides an experience of the movement qualities of different world cultures.

102. Fundamentals of Movement.
Movement through the use of technique and improvisation. Emphasizes spontaneity, joy in moving, self-awareness and is based on experiential anatomy and developmental movement patterns. Provides strong foundation for further study in dance, theater, or sports. No previous dance training required.

104. Contact Improvisation I.
Rooted in dance, martial arts and studies of body development and awareness. A duet form where partners use weight, momentum, and inertia to move each other freely through space. Solo and duet skills, rolling, falling, balance, counter-balance, jumping, weight sharing, spirals explored. Skill work combined with more open dancing in a supportive and focused environment. No previous dance training required.

105. Creative Improvisation through World Percussion.
Improvisation as a process and vehicle for personal expression. Investigate rhythms and music of the world through hands-on performance, hand-drumming technique, readings and video presentations. Discover how music in general, and drumming in particular, joins people together in a shared experience of sound and vibration that is both ancient and contemporary.

110. Beginning Dance Techniques (Jazz, Ballet, and Modern).
Introduction to dance technique, specifically in Jazz, Ballet and Contemporary Modern Dance. Emphasis will be on the development of basic skills, energy, strength, control, breath, alignment, continuity and connectivity, and rhythmic and bodily awareness. No prior training is necessary or expected.

114. Introduction to Anusara Yoga.
A powerful system of hatha yoga that integrates a Tantric philosophy of intrinsic human goodness, Universal Principles of Alignment and an artistic method of expressive movement. Honor unique differences and limitations through self-examination, discovery and receptivity. Unifies traditional Indian philosophy with practical implementation, classic yoga asana with a creative movement application.

116. Introduction to Contemporary Ballet.
Contemporary Ballet will approach ballet technique through the lens of somatic practices and will focus on providing a strong technical base. Phrasing, musicality and efficiency of movement will be emphasized. Provides a theoretical context, looking at ballet history and art and culture in society.

125. Introduction to Dance Therapy.
Introduction to Dance/Movement Therapy probes the ecology and roots of dance/movement therapy in dance, cultural studies, counseling, and psychology. Compares and contrasts varying approaches to the theory and practice of dance/movement therapy and examines the links among core elements of dance and mental health. Experientials, creative dance, and videotapes of actual sessions with a variety of populations highlight these concepts.

171. Capoeira: Brazilian Art Movement.
An art form of self-defense with aerobic and dance elements that brings together a harmony of forces. Through history, movement and culture, students gain self-confidence, power, flexibility, endurance, and tools towards self-discovery. Open to all, Capoeira balances the body, mind, and soul and enables one to break through limits, revitalizing oneself for everyday life.

181. West African Dance Forms I.
African styles from the traditional cultures of Ghana and Guinea, West Africa. Technical emphasis focuses on foot patterns, placement, and development of proper physical stance. Gain a broadened perspective on contemporary West Africa and its cultural practices.

190. Middle Eastern Dance: Folkloric/Bedouin.
Traditional Folkloric roots of Middle Eastern Dance, focusing on specific Bedouin dance styles of North Africa (Raks Shaabi). Discourse and research will address issues of gender and body image. Improving strength, flexibility and self-awareness of the body, the class work will include meditative movement, dance technique, choreography and improvisation. No prior dance experience necessary.

203. Contact Improvisation II.
A continuation of DAN 104 that is taught concurrently with the introductory course. Students in DAN 203 will gain a deeper experiential and intellectual knowledge of contact by exploring issues further. Work includes both more advanced practice with other DAN 203 students, and the experience of helping teach the DAN 104 students the basic principles of contact.

204. Contact Improvisation and Culture.
Rooted in dance, the martial arts and studies of body development and awareness. Partners use weight, momentum, and inertia to move each other freely through space. Solo and duet skills such as rolling, falling, balance, counter-balance, jumping, weight sharing, and spirals will be explored. Skill work will be combined with more open dancing in a supportive and focused environment.
208. T’ai Chi: Movement Art and Culture.
A traditional Chinese martial art and its intimate relationship to the cosmological, physiological, and philosophical conceptions found in the culture and thought from which it emerged. Cross training exercise for the dancer or athlete and provides training for relaxed strength, whole body coordination, balance, centered alignment, timing, weight shifting and moving with fluid grace.

Traditional Chinese internal art consisting of practice of sets of energy exercises to build outer and inner strength. Self-healing modality designed to balance and harmonize the energy flow of the body, improve breathing and relax the mind for health, fitness, and longevity. Provides dancer with training for better breathing, body awareness, concentration, mental presence, imagery, and cultivating and expressing energy.

211. Tai Chi: Explorations in Qi.
Tools for the mobilization of qi, or energy, in order to achieve health, healing, and mind-body-spirit integration. Combines movement, meditative, and breathing exercises and traditional forms with readings, video, creative exercises, exploratory projects, and discussions of literature and philosophy to explore how these transformative arts can lead to mental and physical balance and creative expression.

213. Jazz Dance.
Vernacular jazz movement as it relates to jazz music and its historical context. Stylistically eclectic courses will blend the challenges of full-bodied, culturally influenced dancing with a sense of one’s own self. Development of basic skills, energy, strength, control, continuity, and rhythmic and bodily awareness.

216. Yoga and Experiential Anatomy.
Yoga asanas (postures) act as a unifying hub for learning about and experiencing the human anatomical system. Variety of other movement and meditation disciplines will complement this process. Delving experientially into bones, muscles, organs, nervous system, and bio-energetic theories will bring deeper awareness to the exploration of the yoga asanas, as well as to our daily functional movement.

220. Sacred Dance and Yoga.
Explores what sacred dance is and how can the sacred be revealed from within through the study and practice of the following topics: dance history overview, goddess worship and feminine spirit, women iconoclasts of American modern dance, spirituality and the body temple and various yoga practice techniques. Learn traditional dance sequences, circle dancing and dances of Universal Peace.

225. Anusara Yoga II.
Offers the continuing student of yoga a deeper experience and understanding of Anusara Yoga through its Universal Principles of Alignment, methodology and foundation in classical Indian and Tantric philosophy. A level II syllabus of asana (poses), both challenging and creatively inspiring, will be taught as a continuation of the level I syllabus.

230. Yoga and Living Anatomy.
Take a fresh look at the experience of inhabiting a human body, its support, postural alignment and movement. Through active and restorative yoga asanas (poses), somatic practices, and study, explore our anatomical structures and systems and their relationships within the whole. Discover resources for self-awareness, support, ease, stress relief, and embodiment.

240. Rhythm Tap Dance.
Development of basic skills, energy, strength, control, continuity, and rhythmic and bodily awareness through the teaching of rhythm tap dance. Previous tap dance experience is expected.

Dance appreciation and technical practice. Practice contemporary dance experientially through examining movement principles and exploring choreographic combinations. Investigate context, history, applications and societal impact of Modern and Contemporary dance. Hone skills of observation, movement analysis and interpretation of dance as an art from a personal perspective as well as within a larger cultural and historical framework.

Dance appreciation and technical practice. Practice classical ballet technique and theory with a contemporary perspective and investigate context, history, applications and societal impact of Ballet. Phrasing, musicality and efficiency of movement will be emphasized.

265. Contemporary Dance Technique A.
Focus is on contemporary dance, a form that is an evolving exploration of expression through movement. It will blend the challenges of full-bodied, momentum-driven dancing with a sense of one’s own self-awareness and discovery. Through rigorous dancing, move beyond not only physical, but also artistic boundaries and dimensions.

271. Capoeira II: Music and Motion.
Deeper study of Capoeira. This second level will find students continuing to build strength, coordination, rhythm, and balance. Students will also become further involved with the instrumentation of Capoeira. Readings and discussions will explore into historical events and look at Capoeira and its Afro-Brazilian spirituality, liberation and cultural revolution throughout the ages. Each class involves daily physical and music training.

278. Choreography.
Experiment with improvisational structures and various methods of making dances, focusing on examining craft in the service of
choreographic expression. Elements of time, space, shape, effort and how they affect quality and content. Drawing from many sources and disciplines to practice diverse approaches to creativity, experimentation and choreography.

281. West African Dance Forms II.
The focus is on the increasingly complex dance repertoires of Ghana and Guinea, West Africa. A more specified investigation of regional context and cultural function of the dances are emphasized. Repertoire dances include Sinte, Kassa, Yamama, & Somuninku from Guinea and Adowa, Slow Agbekor, & Gahu from Ghana.

290. Middle Eastern Dance: Orientale.
Improve strength, flexibility and self-awareness of the body. Includes meditative movement, dance technique, improvisation and rhythm identification through music and drumming. Dance forms such as Egyptian, Turkish, and American Tribal will be taught. Traditional costume will be addressed. History, art, and culture from these countries will be explored and experienced. Discourse and research topics will explore issues of gender, body image, historical perspectives and Orientalism.

385. Dance Performance Workshop.
Creating new movement within a choreographic process, through new work and/or repertory that will be adapted in order to draw on the unique artistry of each of the dancers experience of a realistic, efficient rehearsal process, addressing a variety of performance techniques and carrying out various production aspects of performance.

Earth and Environmental Sciences

Asish R. Basu, PhD (California, Davis)
Professor of Geology

Cynthia Ebinger, PhD (MIT)
Professor of Geology

Gautam Mitra, PhD (Johns Hopkins)
Professor of Geology

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Assistant Professor of Earth and Environmental Sciences

Udo Fehn, PhD (Munich)
Professor Emeritus of Geology

Lawrence W. Lundgren, Jr., PhD (Yale)
Professor Emeritus of Geology

Bob Sutton, PhD (Johns Hopkins)
Professor Emeritus of Geology

The Department of Earth and Environmental Sciences offers five distinctive degree programs and provides its students with excellent opportunities for communicating and working with its faculty members and graduate students, both in and outside of the classroom. Each of the degree programs is designed to serve special interests of the students and the particular demands associated with professional work in various areas of the earth sciences.

The degree programs consist of the BA in geological sciences, the BS in geological sciences with concentrations in geology, geochemistry or geobiology, the BS in geomechanics (GEM), the BA in environmental studies, and the BS in environmental sciences. The three BS programs are designed to give students the background for graduate work and professional careers in the earth and environmental sciences and in those areas in which the earth sciences overlap with the life sciences or with engineering. The two BA programs are designed to allow more flexibility in program design and are pursued not only by students preparing for graduate work in the earth sciences but also by students interested in law, management, or teaching. The department also offers minors in geological sciences and environmental geology.

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 or can participate in a course that provides field experience studying active geological processes in California.

Faculty encourage advanced undergraduates to participate in North American and overseas field research programs. Most undergraduates participate in active laboratory research in fields such as atmospheric science, geophysics, geochemistry, paleontology, petrology, structural geology, tectonics, seismology, stratigraphy, geodynamics, magnetostratigraphy, geology, public policy, paleoclimates studies, and environmental geology.

The Undergraduate Student Geological Organization (USGO) is an active student-led organization that provides special field trips, speakers from other universities and colleges, and social events throughout the academic year.

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 foreign languages.

At least two courses are required to fulfill the department’s upper-level writing requirement. A list of courses and a description of the requirement can be found in the Earth and Environmental Sciences’ Upper-Level Writing Requirement document available online or in the department office.

Structure of Degree Programs
Each of the five degree programs and the suggested paths or tracks are outlined below.

BS in Geological Sciences
Required Courses
MTH 161, 162, 163, or MTH 141–143, 163 (calculus AP credit is acceptable)
PHY 121 (113 for geobiology track) (physics AP credit is acceptable)
PHY 122 (114 for geobiology track) (physics AP credit is acceptable)
CHM 131 (chemistry AP credit is acceptable)
CHM 132 (chemistry AP credit is acceptable)

Geology Core Courses
EES 101. Introduction to Geological Sciences
EES 201. Evolution of the Earth
EES 203. Sedimentology and Stratigraphy
EES 204. Mineralogy
EES 208. Structural Geology

Geology Track Required Courses
EES 206. Petrology and Geochemistry
EES 205. Geophysics
or
EES 207. Invertebrate Paleontology

Suggested Course Sequence for BS in Geological Sciences

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<tr>
<th>Geology Track</th>
<th>First Year</th>
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<th>Third Year</th>
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<td>MTH 161</td>
<td>MTH 162</td>
<td>EES 207 or EES 205</td>
<td>EES 391</td>
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<td>CHM 131</td>
<td>PHY 121 or CHM 132</td>
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<td>EES 201</td>
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BA in Geological Sciences
Required Courses
MTH 161 or MTH 141–142 (calculus AP credit is acceptable)
PHY 121 (physics AP credit is acceptable)
CHM 131 (chemistry AP credit is acceptable)
One other course in related sciences (mathematics, physics, chemistry, biology, or statistics)

Geology Core Courses
EES 101. Introduction to Geological Sciences
EES 201. Evolution of the Earth
EES 203. Sedimentology and Stratigraphy
EES 204. Mineralogy
EES 208. Structural Geology

Technical Electives
Three technical electives should be chosen to create what the students and faculty advisor(s) view as a coherent program. Any EES courses at the 200 level or higher are acceptable. One 100-level EES course may be acceptable if it was taken in the first year.
Field Course
This requirement may be satisfied by participating in a 6–8 week summer field course in geology or by undertaking supervised fieldwork (EES 299) with approval of the advisor.

Technical Electives
Four technical electives in EES should be chosen to create what the students and the faculty advisor(s) view as a coherent program that leads to an advanced understanding of the earth sciences. One 100-level EES course may be acceptable if it was taken in the first year. Technical electives should be courses distinct from required courses in the track.

Senior Thesis
In addition to the above courses, students are encouraged to undertake a research project culminating in a thesis written in the senior year (EES 393). Students who complete a senior thesis receive honors. The level of honors will be determined by the students’ thesis committee.

Geochemistry Track
Required Courses
EES 206. Petrology and Geochemistry
Two courses in geochemistry chosen from the following:
   - EES 217. Physical and Chemical Hydrology
   - EES 218. Chemistry of Global Change
   - EES 248. High Temperature Geochemistry

Field Course
This requirement may be satisfied by participating in a 6–8 week summer field course in geology or by undertaking supervised fieldwork (EES 299) with approval of the advisor.

Technical Electives
Three technical electives in EES or CHM should be chosen to create what the students and the faculty advisor(s) view as a coherent program that leads to an advanced understanding of the earth sciences. One 100-level EES course may be acceptable if it was taken in the first year. Technical electives should be courses distinct from required courses in the track.

Senior Thesis
In addition to the above courses, students are encouraged to undertake a research project culminating in a thesis written in the senior year (EES 393). Students who complete a senior thesis receive honors. The level of honors will be determined by the students’ thesis committee.

BS in Environmental Science
Requirements
The BS in environmental science provides a strong foundation in the natural sciences and mathematics, a broad background in Earth sciences, as well as the strong analytical, quantitative, and communication skills needed to solve problems related to Earth systems and resources. The acquired knowledge and skills are excellent training for graduate research in a variety of fields (e.g., hydrology, geochemistry, oceanography, environmental geophysics, and atmospheric science) and careers in environmental and geological consulting, environmental law, or governmental advising.

Basic Courses
BIO 110, 111
CHM 131, 132, 203, and 207
MTH 161, 162 (or 141–143), and 163 or 165
PHY 113/121, 114/122

Core Courses
EES 101 or EES 103. If both are taken, the second can be counted as a technical elective if taken before the senior year
Choose three out of four of the following: EES 211, 213, 216 or 218. Chemistry emphasis must include both EES 216 and 218. Geology emphasis must include EES 211 and 213. If all four courses are taken, then the fourth will be counted as a technical elective

Technical Electives
A minimum of 16 credit hours of technical electives are required, chosen from tracks in biology, chemistry, or geology. Courses in this category are selected from a list of approved courses by the students in consultation with a faculty advisor. The program is completed with two closure courses (8 credit
hours) from an approved list or by finishing a Senior Project (8
credit hours) with environmental content (selected in consulta-
tion with the Advising Committee). The senior project can be
carried out in any department willing to offer such a project.

BA in Environmental Studies

Requirements
The BA in environmental studies is designed to guide students
who have interests in environmental management through a
program that links courses in the natural and social sciences.
Students successfully completing this program could expect to
pursue graduate programs in such fields as law, public policy,
urban and regional planning, and environmental management or
to find entry-level employment with consulting firms and public
agencies.

Prerequisite Courses
BIO 110 or 111
CHM 131
MTH 161

Core Courses
EES 103
Three out of four of the following: EES 211, 213, 216, 218. If
all four courses are taken, then the fourth will be counted as a
technical elective.

Elective Courses
Elective courses come from two groups: natural sciences and
engineering and social sciences. A total of seven elective courses
is required (three or four from either group), to be chosen from a
list of approved courses by the student in consultation with a fac-
ulty advisor. In addition, one course in statistics, mathematics, or
computer science from an approved list is required. The program
is completed with at least one closure course from an approved
list. Seminars or senior theses with environmental content of-
erred in other departments are also acceptable (after approval by
one of the program advisors).

BS in Geomechanics
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 associ-
ated with the atmosphere, rivers, lakes and oceans, and the solid
earth. Students successful in this program are well equipped
for graduate work in a variety of fields, including geophysics,
hydrology, 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, Edmund A. Hajim School of Engineering and Ap-
plied Sciences.)

Requirements
MTH 161, 162 (or 141–143), 163, and 164
PHY 121, 122, 123
CHM 131
EES 101, 201, 204, and 208
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 EES 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 par-
ticular interest to the student or to broaden the scope of the
curriculum.

Minor in Geological Sciences
Six courses are required from the following:

Required Courses
EES 101. Introduction to Geological Sciences
EES 201. Evolution of the Earth
Any four of the following:
EES 203. Physical Sedimentology
EES 204. Mineralogy
EES 205. Geophysics
EES 207. Principles of Paleontology
EES 208. Structural Geology
EES 241. Igneous and Metamorphic Petrology

Students taking this minor acquire a broad grasp of geology
and are able to build upon it as a solid foundation for a major
should their career plans change.

Minor in Environmental Geology
Six courses are required (three specified and three electives).

Specified
EES 101. Introduction to Geological Sciences
EES 103. Introduction to Environmental Science
EES 215. Environmental and Applied Geophysics

Three courses from the following:
EES 201. Evolution of the Earth
EES 203. Sedimentology and Stratigraphy
EES 204. Mineralogy
EES 208. Structural Geology
EES 211. Earthquake and Volcanic Hazards: Living on an Active
Planet
EES 217. Physical and Chemical Hydrology
EES 218. Chemistry of Global Change
EES 219. Energy and Mineral Resources
The environmental geology minor is intended especially for natural-science and social-science majors who are planning on further study or employment in environmental fields.

Upper-Level Writing Requirement
At least two courses are required to fulfill the department’s upper-level writing requirement. A list of courses and a description of the requirement can be found in the Earth and Environmental Sciences’ Upper-Level Writing Requirement document available online or in the department office.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

101. Introduction to Geological Sciences.
This introductory geology class provides a broad overview of the earth sciences, from planetary evolution to the interplay of geology and climate. The course is a prerequisite for all undergraduate majors who are considering careers in the earth and environmental sciences, while also satisfying science requirements for other undergraduate majors. We will introduce the class with the unifying framework for Earth Science: plate tectonics. Throughout the semester we will look at the physical interactions between different realms on Earth, including the interior (core and mantle), the outer shell (termed lithosphere), oceans and atmosphere. We will explore the dynamic processes operating on Earth and how these processes have been recorded and have varied over the geologic history. During the last third of the semester, we will discuss geologic problems that have a particular relevance to humans, such as energy and mineral resources, water resources, climate and global change.

102Q. Earthquakes, Volcanoes, and Mountain Ranges: a Field Quest.
Understanding how the Earth works starts with an appreciation of geological processes in action. To observe these dynamic processes such as earthquakes, volcanic eruptions and mountain formation, Earth scientists must travel to areas of geological youth, such as California. In this Quest, students are introduced to active geology through readings and discussion sections in preparation for a field excursion to California. Students will learn how to examine critically ideas on how Earth science systems work and how active processes affect society.

103. Introduction to Environmental Science.
An introduction to the natural processes that shape conditions at the Earth’s surface, their interrelationships, and the modification of these processes by human activity. Topics include ecology and population growth, water resources, air and water pollution, global warming, energy consumption, solid waste, and food production.

104Q. Environmental Quest in the Field and Laboratory.
In this quest, small groups of students will conduct an environmental investigation of an actual field site in the Rochester area. Through a series of experiments involving mapping, sampling, laboratory analysis and data interpretation, students will attempt to achieve an understanding of a specific environmental problem. The coordination of the lab experiments allows students to build on skills learned in previous sessions and to recognize the linkages among a variety of investigative approaches. The semester will culminate with the presentation of the results in a departmental forum.

105. Introduction to Climate Change.
This course will explore the Earth’s dynamic climate system through lectures, discussions and hands-on laboratory activities. The course is designed to be accessible to all students. We will work toward an understanding of several fundamental and important questions. What are the main factors that determine the Earth’s climate? What forces can drive climate to change? What can we learn from climate change in the Earth’s distant past, when our planet experienced periods of both extreme cold and warmth? How do we know that our climate is now changing? What can we expect from the Earth’s climate in the near future and how would it affect us?

106. Meteorites and Impact Craters.
An introduction to the geology of the solar system from the perspectives of earth science and the fascinating world of meteorites, asteroids, comets, and impact craters. Special emphasis is on the meteorite evidence for our understanding of planetary formation, the role of impacts and mass extinction, and the origin of the moon.

National and worldwide patterns of production and consumption of renewable and non-renewable energy sources and the connection of those patterns to socioeconomic conditions. For each resource, we consider the environmental effects of extraction, distribution, and consumption; how efficiently the resource is used and for what end uses; current reserves and projections for the future; socioeconomic and political factors affecting the resource’s utilization; and international trade patterns and energy security. The course concludes with an overview of emerging energy technologies.

201. Evolution of the Earth.
Historical geology encompasses the (1) dynamic history of the physical earth: the development of land forms, rise and fall of ancient seas, movements of continents, etc., and (2) the evolution of historical geology such as paleontology, sedimentology, stratigraphy, geochronology, and plate tectonics, and a chronological survey of earth and life history, emphasizing the evolution of North America.
202Q. Plate Tectonics and Active Geologic Processes in California.

Understanding how the Earth works with an appreciation of geological processes in action. To observe these dynamic processes such as earthquakes, volcanic eruptions and mountain formation, Earth scientists must travel to areas of geological youth, such as California. In this course, students are introduced to active geology through readings and discussion sections in preparation for a field excursion to California. Students will learn to examine critically ideas on how Earth science systems work and how active processes affect society. This course is the complement to EES 102Q, and is intended for geology and environmental science majors.

203. Sedimentology and Stratigraphy.

Sediments and sedimentary rocks cover or underlie much of the Earth’s surface. In them are recorded both evidence of the processes responsible for shaping the planetary surface and the record of life. Sedimentary rocks contain enormous volumes of water; solid and fluid hydrocarbons, as well as other natural resources. Sediments and sedimentary rocks are very important to our way of life, and they are fascinating in and of themselves. This course describes and classifies sedimentary rocks towards understanding the processes that shape them and the environments in which they form.

204. Mineralogy.

Lectures discuss the physical and chemical principles governing the properties and formation of minerals. There are three major divisions of the subject matter: (a) geometric and optical crystallography; (b) crystal chemistry and properties of minerals, and (c) occurrence, origins, and pressure-temperature stabilities of the major rock-forming minerals. Laboratories are devoted to exercises in crystallography, X-ray diffraction, optical mineralogy and hand-specimen mineral identification.

205. Solid Earth Geophysics.

This course is intended for motivated students that are interested in an introduction to geophysics. Material covered will focus on deep Earth processes: an introduction to potential fields, gravity, heat flow, magnetic fields, propagation of seismic waves, and a bottom-up approach to core processes, mantle flow and plate tectonics.

206. Petrology and Geochemistry.

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 in the laboratory.

207. Principles of Paleontology.

This course is designed to introduce the basic principles of paleontology—the study of fossil organisms in the geological record. Topics to be covered include: taphonomy and the processes of fossilization, principles of evolution as evidenced by the fossil record, taxonomy and the recognition and naming of fossil species, biostratigraphy as a means of dating a rock and/or learning about ancient environments, geochemistry of fossils as a means to understand ancient habitats and behaviors. This course will include an overview of important fossil groups with hands-on experience and a field trip.

208. Structural Geology.

Recognition and interpretation of geologic structures. Topics include geometric analysis of faults, folds, joints, and rock fabrics; an introduction to stress analysis, theories of brittle failure, finite strain analysis, ductile deformation, application to geotectonics. Laboratory work concerned with structural analysis.

211. Geohazards and Their Mitigation: Living on an Active Planet.

Earthquakes and volcanic eruptions are violent manifestations of plate tectonics, the movement of the relatively rigid plates forming the Earth’s outer shell. Ground movements and shaking from these events may generate tsunamis, slumping and mass wasting, and increase risk in other areas. Global and regional sea level rise changes forces on the plates, motivating reconsideration of hazard assessments. Large volumes of aerosols and greenhouse gases are emitted during the volcanic eruptions, with implications for global climate change. The first third of the class focuses on the causative mechanisms of earthquakes, volcanoes, tsunamis, volcanic-eruption induced climate change. The second third outlines the consequent hazards and forecasting efforts, and feedbacks between these processes. The final third of the course examines mitigation programs, with numerous case studies.


This course aims to image the internal structure of the oceans and continents using geophysical methods. Topics include physical processes occurring within Earth’s plates, including solar and internal energy sources, movement of fluids in the oceans and plates. Geophysical methods used to detect these processes and to constrain physical properties, including seismic, electromagnetic, gravity as measured from surface, subsurface and satellites. Laboratory examples include environmental site remediation, hydrocarbon and mineral exploration, archeological remote sensing, tsunami detection, and groundwater exploration.
218. Atmospheric Geochemistry.
The atmosphere helps to maintain habitable temperatures on our planet’s surface, shields life from destructive cosmic and ultraviolet radiation and contains gases such as oxygen and carbon dioxide, which are essential for life. In this course we will use lectures, discussions and hands-on activities to work toward an understanding of several important questions. How did the Earth acquire and atmosphere? What is in the Earth’s atmosphere? What are the sources and sinks of the most important gases in the atmosphere? What is the role of photochemistry in atmospheric composition? How does the atmosphere interact with the land and oceans? How has human activity affected the atmosphere?

National and worldwide patterns of energy production and consumption and socioeconomic connections. Environmental effects of extraction, distribution and consumption; efficiency of resource use; current and projected reserves; socioeconomic and political factors affecting resource utilization; and international trade patterns and energy security.

248. High Temperature Geochemistry.
An introduction to the principles of geochemistry. The first portion of the course is devoted to basics, especially thermodynamics, and isotopes (both stable and radiogenic) geochemistry. The middle portion of the course deals with high temperature processes and crystallization. The last part of the course covers lower temperature processes including weathering, sediment diagenesis and element cycling through the lithosphere.

251. Introduction to Remote Sensing and GIS.
Students will learn the basic principles of satellite, airborne and other remote sensing data acquisition systems, and the processing and interpretation of acquired data sets. Case studies and computer-based practicals will focus on visible to near-infrared, thermal and radar imaging of continents and seafloor. Course material will include a review of geographic coordinate systems and projections for georeferencing remotely sensed data as a basis for Geographic Information Systems analysis.

252. Marine Geology.
This course will provide a comprehensive review of modern marine geology with an emphasis on the deep sea. Areas identified by the international ocean drilling community as of high research priority will be discussed, including new techniques used to study such problems. Four subject areas will be addressed: lithosphere, tectonics, ocean history and sedimentary geochemistry and physical processes.

253. Geodynamics.
Processes that create and modify Earth and the terrestrial planets are examined using an “earth engineering” approach. Emphasis is placed on plate tectonics, with discussion of current research in mantle convection. The final third of the course focuses on active plate tectonic boundaries, and evidence for plate tectonics on Mars and Venus.

This course will focus on geologic and geophysical studies of planets (interiors and surfaces), and the conditions that led to the origin of life. We will start with initial conditions, defined here as the formation of Earth and the Moon-forming event, and trace development of the planet from cooling of the magma ocean onwards. We will then consider how our planetary neighbors (Venus and Mars) evolved, and as we look at our planetary neighbors we will consider how the solar system that may harbor life, or provide insight into early conditions on Earth.

256. Paleomagnetism and Global Plate Tectonics.
The basic paleomagnetic methods used to determine absolute plate motions are reviewed. Applications include the potential cause and effect relationship between changes in absolute plate motions, mantle plume volcanism, orogeny, and climate change. (Alternate Springs)

257. Topics in Advanced Seismology.
This course examines wave propagation in the Earth, and introduces helioseismology. Classes focus on theory of waveform modeling, moment tensor inversions, low frequency earthquakes and related topics. Laboratory work focuses on Matlab-based programming.

258. Hotspots and Plate Motions Seminar.
This course will provide a basic understanding of hotspot models, hotspot fixity and the relationships between hotspots, mantle plumes, true polar wander and plate motions. Hypothesis development and testing will be discussed, as will the basic elements of grantmanship.

259. Seminar in Paleomagnetism.
Current topics in paleomagnetism and rock magnetism are explored through literature reviews and modeling studies. Topics range from the history of plate tectonics to biogenic magnetism. An introduction to basic concepts in paleomagnetism and rock magnetism is included.

264. Paleoenvironmental Reconstructions
Using Light Stable Isotopes. This class will focus on techniques used in environmental reconstruction to address questions related to paleoclimate, paleotemperature, paleovegetation and paleoelevation. We will examine the use of stable isotopes in paleoenvironmental reconstruction with particular emphasis on O,C, and H and N isotopes. The class will start with a thorough introduction of the geological framework of the environments of interest and the processes of light isotope fractionation. This will be followed by “emphasis areas” that highlight the basics and latest developments in a variety of environmental systems, including the oceans, rivers, ice, lakes, soils and fossils.
266. Topics in Climate and Environmental Change.
This seminar course will explore specific topics in the field of climate and environmental change. The seminar will delve into the classic as well as most current literature in the selected area. Students will get practice with reading and understanding primary scientific literature, scientific discussion and debate, oral presentation of scientific results, as well as scientific writing. Specific topics will vary each semester.

269. Stable Isotopes in Geochemistry.
This course will examine the distribution of the stable isotopes of hydrogen, carbon, oxygen and nitrogen in biological sedimentary, metamorphic and igneous processes.

270. Vertebrate Paleontology.
This course will cover the fossil record of vertebrate animals. Topics to be covered include: The origin of vertebrates, phylogenetic relationships among modern vertebrates, introductory osteology and comparative anatomy of vertebrates, the advent of bone, the transition to land, the origin of flight in vertebrates, the warm-blooded vs cold-blooded controversy in dinosaurs, the relationship between birds and dinosaurs, hominid evolution and the origin of man. Readings from the current scientific literature will be used.

274. Seminar in Paleoceanography.
Prerequisite: permission of instructor.
Credit—2 hours
Topics of discussion include the history of deep-water formation and surface circulation, geochronology, stratigraphy, and ocean chemistry and the results from deep-sea drilling in general.

We will discuss basin classification schemes, isostasy, flexural and thermal subsidence, effects of mantle dynamics, basin stratigraphy, and techniques used to study sedimentary basin evolution. By determining how sedimentary basins develop and fill, we will better understand the tectonic and eustatic controls on subsidence and surficial processes.

Orogeny and its relationship to plate tectonics. Structural style and tectonic history of mountain belts with special reference to the Appalachians and Cordilleras. Homework assignments involve drawings and interpreting cross-sections through mountain belts. Field trip to the Appalachians to look at typical structures of mountain belts.

286. Seminar in Sedimentology and Tectonics.
Interpreting the lithofacies and chemistry of sedimentary rocks to understand paleoenvironment; impact of tectonics on climate. Topics will vary each semester. Classwork will involve readings, presentations and discussions of classic and current literature.

Geometry of thrust faults and thrust belts. Mechanics of thrust motion and thrust emplacement. Requires one major term paper that will require revision after initial review.

298. Introduction to Research Methods.
A basic introduction to research in the Earth and Environmental Sciences will be provided in one of the laboratories that comprise the Department's Center for Analytical Geosciences.

299. Field Geology.
This course covers the essential geologic and geophysical approaches to field stratigraphy, mapping, and structural interpretation. The coursework is based on observations made during a substantial field excursion (usually six weeks long). Additional credit may be earned by laboratory analysis of samples collected during the field excursion.

318W. Environmental Decisions.
Discussion of major environmental issues such as water use, pollution and energy availability. Analysis of decisions resulting in environmental change. The interaction of scientists with the public and policymakers. Seminar format with oral presentations and papers. A writing course.

360. Environmental Quest in the Field.
This course provides instruction in laboratory techniques used in the analysis of natural waters. The laboratory techniques are applied to the study of local environmental problems and include instruction in atomic absorption spectrophotometry; ion and gas chromatography, as well as standard “wet” chemical techniques.

390. Supervised College Teaching.
Attendance of all primary class lectures. Assist in at least one laboratory session per week and general preparation for answering student questions. Preparation and delivery of at least one laboratory lecture and summary discussion following the lab. Assistance with setup and dismantling of extensive lab displays of rocks, fossils and maps. Assistance with grading of lab quizzes and homework assignments and in proctoring exams.

391. Independent Study.
Students must have permission. Interested students should meet with their advisor regarding course content.

393. Senior Thesis.
Students should seek out the faculty member he/she wishes to do a senior thesis with. Students should pick up independent course forms from Lattimore 312. Course is suited to each students abilities. Questions should be directed to your major advisor.
394. Internship in Earth and Environmental Sciences.
Students should contact their major advisor for details. Closure course for Environmental Studies majors (ESP) and Environmental Science majors (EVS)

Economics

Professor

Mark A. Aguiar, PhD (MIT)  
Professor of Economics

Mark Bils, PhD (MIT)  
Professor of Economics

John Duggan, PhD (Caltech)  
Professor of Political Science and of Economics

Stanley L. Engerman, PhD (Johns Hopkins)  
John Munro Professor of Economics and Professor of History

Ronald W. Jones, PhD (MIT)  
Xerox Professor of International Economics

Steven Landsburg, PhD (Chicago)  
Professor of Economics

William Thomson, PhD (Stanford)  
Elmer B. Milliman Professor of Economics and Professor of Economics

Associate Professor

Paulo Barelli, PhD (Columbia)  
Associate Professor of Economics

Yongsung Chang, PhD (Rochester)  
Associate Professor of Economics

Assistant Professor

Carol Caetano, PhD (California, Berkeley)  
Assistant Professor of Economics

Gregorio Caetano, PhD (California, Berkeley)  
Assistant Professor of Economics

Bin Chen, PhD (Cornell)  
Assistant Professor of Economics

William Hawkins, PhD (MIT)  
Assistant Professor of Economics

Jay H. Hong, PhD (Pennsylvania)  
Assistant Professor of Economics

Joshua Kinsler, PhD (Duke)  
Assistant Professor of Economics

Ryan Michaels, PhD (Michigan)  
Assistant Professor of Economics

Roman Pancs, PhD (Stanford)  
Assistant Professor of Economics

Ronni Pavan, PhD (Chicago)  
Assistant Professor of Economics

Gábor Virág, PhD (Princeton)  
Assistant Professor of Economics

Nese Yildiz, PhD (Stanford)  
Assistant Professor of Economics

Senior Lecturer

Michael Wolkoff, PhD (Michigan)  
Senior Lecturer in Economics and Public Policy

Lecturer

Michael Rizzo, PhD (Cornell)  
Lecturer in Economics
The Department of Economics offers a program of study leading to the BA degree in economics, financial economics, and economics and business strategies, and at the graduate level, to the MA and PhD degrees. The department also offers a minor in economics as well as six different economic clusters.

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, and on the web at www.econ.rochester.edu.

**BA in Economics**

**Requirements**
- One year of calculus established by the successful completion of MTH 143, 162, 172, or equivalent.
- ECO 108 (must not be taken after any 200-level economics course; students may place out of ECO 108 and substitute a 200-level economics course).
- ECO 230 (Economics Statistics). Students may substitute STT 213 or MTH/STT 203 as alternatives.
- ECO 207, 209, 230, and 231 (all completed by end of junior year).
- Four additional economics courses (200 level or above, except 194; 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.
- Completion of the upper-level writing requirement.

**BA in Financial Economics**

**Requirements**
- One year of calculus
- ECO 108 (must not be taken after any 200-level economics course; students may place out of ECO 108 and substitute a 200-level economics course).
- ECO 230 (Economics Statistics). Students may substitute STT 213 or MTH/STT 203 as alternatives.
- ECO 207, 209, 230, and 231 (all completed by end of junior year).
- FIN 205.
- FIN 206.
- Three additional 200-level electives (one of which must be ECO 211, 217, 232, 233W, 263, 268, 270, or 274).
- Accounting 221.
- MTH 210 (Introduction to Financial Mathematics). Must be taken prior to second finance course.
- Completion of the upper-level writing requirement.

**BA in Economics and Business Strategies**

**Requirements**
- One year of calculus
- ECO 108 (must not be taken after any 200-level economics course; students may place out of ECO 108 and substitute a 200-level economics course).
- ECO 230 (Economics Statistics). Students may substitute STT 213 or MTH/STT 203 as alternatives.
- ECO 207, 209, 230, 231, and 251 (all completed by end of junior year).
- Specialized track of four advanced courses; choose Organizations and Markets (Path A) or Methods for Market Analysis (Path B)

**Path A: Organizations and Markets**
- ECO 288. Introduction to Game Theory
- ECO 274. Mathematical Tools in Economics
- ECO 217. Contracts, Organizations, and Markets
- OMG 231 or 201. Operations Management
  - or
- STR 421. Economics of Competitive Strategies (with instructor permission)

**Path B: Methods for Market Analysis**
- MKT 203. Principles of Marketing
- MKT 213. Marketing Projects and Cases
  - or
- MKT 414. Pricing Policies (with instructor permission)
- STT 221W. Sampling Design
- ECO 233. Applied Econometrics
- Three additional electives (choose from economics electives, 200 level or above, Simon electives, or two psychology courses: PSY 264 (Industrial Organizational Psychology), PSY 364 (Achievement and Motivation), or new 200-level philosophy courses in business ethics).
- Completion of the upper-level writing requirement. STT 221W fulfills upper-level writing credit for Path B: Methods for Market Analysis track majors.

**Honors in Economics**

Students seeking an enriched curriculum can pursue a major with honors. The honors program requires additional coursework in mathematics and economics, as well as enrollment in honors designated courses. Honors graduates also write a research paper in Senior Seminar. For specific details on the requirements for a BA with honors, please visit our website at www.econ.rochester.edu.
Citations of Achievement
Students who major in economics can also earn a citation of achievement. More information is available from the department office and on the web at www.econ.rochester.edu.

Minor in Economics
Requirements
ECO 207
ECO 209
Any three additional 200-level economics courses
Students must achieve an overall average of “C” or better in these economics courses counted towards the minor. The economics department will accept up to two transfer courses for the minor. Either ECO 207 or 209 must be taken at the University of Rochester.

Upper-Level Writing Requirement
Students meet the upper-level writing requirement by taking two upper-level writing courses within the Department of Economics. For most students, one of these courses will be 231W (econometrics). The second course can be chosen from a variety of electives, denoted by the postscript “W” in the course schedule. Independent Study and Internship courses can be taken for “W” credit with instructor approval.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

SCHEDULING
ECO 108, 207, 209, 230, and 231 are offered in fall, spring, and summer. Elective courses are generally offered not more than once each year.

The fundamentals of microeconomic and macroeconomic theory, with applications; preparation for subsequent economics courses.

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.

207H. Intermediate Microeconomics.
This course shows how the choices of consumers and firms interact through markets to determine all the factors related to economic well being. In comparison to other sections of ECO 207, this section develops these choices more formally and mathematically.

208. Topics in Microeconomic Theory.
This course is a sequel to ECO 207. It covers a variety of topics in microeconomics. The precise content varies, but usually included a more detailed look at the theory of the firm, analysis of simultaneous equilibrium in many markets, and allocation of resources over time and under uncertainty.

National income accounting concepts; their changes and fluctuations as explained by theories of income determination.

209H. Intermediate Macroeconomics.
National income accounting concepts, their changes and fluctuations as explained by theories of income determination. In comparison to other sections of ECO 209, this section develops those concepts more formally and mathematically.

211. Money, Credit, and Banking.
The institutions that generate the money supply. The influence of monetary and fiscal policy on economic stability and growth.

217. Economics of Contracts, Organizations, and Markets.
This course examines how markets can engineer trades that maintain incentives in the face of transactions costs and information problems—problems of moral hazard and adverse selection. Emphasis will be placed on applications to insurance and employment markets, but with extensions to firm pricing, corporate finance, and public policies.

220. Fair Allocation.
Examines issues of distribution and justice from an economics perspective. Topics that may be examined include fair taxation, fair political representation, apportioning the cost of NATO among the members, and dividing outer space.

223. Labor Economics.
Economics is used to understand the determination of wages, employment, workweeks; the acquisition of skills; unions, discrimination, and unemployment.

224. Economics of Sports.
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.

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.
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.

This course is an introduction to the probability and statistical theory underlying the estimation of parameters and testing of hypotheses in economics. Linear correlation and simple regression analysis are also introduced. Students will use computers to analyze economic data.

231. Econometrics.
Regression analysis applied to time series and cross-section data, simultaneous equations; analysis of variance.

Many results in the theory of finance rely on the fact that the time series representing financial data follows certain principles. In this course we analyze data in order to decide whether the standard models apply or not.

233W. Applied Econometrics.
The course is an introduction to the application of econometric methods. It covers the basic tools of estimation, inference and forecast of cross-section, time-series and panel data models. The course emphasizes the intuitive understanding and practical application of these basic tools of econometric analysis.

234. Regulation of Economic Activity.
Analysis of the impact of government regulation in transportation, safety, and health on economic welfare and efficiency.

236. Economics of Health.
Analysis of factors that affect supply and demand in the market for medical care: risk, insurance, externalities, ethics, regulation.

237. Economics of Education.
This course applied theoretical and empirical methods of economics to the analysis of elementary and secondary education in the United States. Topics include, but will not be limited to: education investment decisions of individuals and society; measuring the returns to education; the production of human capital with a focus on the role of school inputs’ and evaluating recent k-12 education reforms (high-stakes testing, school choice, school finance) and higher education reforms (financial aid, affirmative action). Students will learn about the practical challenges of education research and how to distinguish good empirical research from bad. Assignments will include both solving theoretical problems and critiquing current research.

251. Industrial Organization.
This course examines the determinants of market structure and market performance. Questions discussed are pricing, product and quality choice, collusion, mergers, vertical restrictions, antitrust policy and related welfare analysis. Additional topics (depending on time) that are covered are networks, auctions, advertisement, and research and development. The course puts a special emphasis on studying strategic situations and using the tools of game theory. We use examples from US and international markets to illustrate the main theoretical ideas.

252. Economies and Societies of Latin America.
(Same as AAS 252 and HIS 203)
Provides historical explanation for the general problem of material poverty and the sociopolitical crises that characterize contemporary Latin America and the Caribbean.

253W. Economic and Social Conditions of African Americans.
(Same as HIS 253 and AAS 253)
Economic development of African Americans during the twentieth century, with an examination of the economics of discrimination.

255. Nigeria Since 1804.
(Same as HIS 272 and AAS 260)
This course is taught in the context of the world economic order, its evolution from the sixteenth century and the location of different parts of the world within it. The course focuses on the historical development of socioeconomic and political structures over time to explain why the giant of Africa has continued to slumber.

261. State and Local Public Finances.
Examination of local taxation, provision of services, and inter-governmental fiscal relations.

263. Public Finance.
This course is intended to be an introduction to the study of the role of government in the economy, with an emphasis on the microeconomic aspects of this role. Both the taxation and the expenditure sides of government activity will be studied. The first part of the course will be devoted to the theory of public finance in order to build a foundation for the remainder of the course, which involved the application of this theory to particular programs and institutions (policy analysis). Typical topic include: public goods, social security, income taxation, tax reform, fiscal federalism, etc.

265. Law and Economics.
Economic analysis of property rights, contracts, torts and civil procedure, crimes and criminal procedure, government regulation and controls, and alternative legal rules and systems.
268. Economics of Globalization.
This course studies the economics of world integration. We will explore the arguments for and against opening an economy to international trade in goods and financial capital. We will specifically focus on the implications of openness for welfare, growth, volatility, and inequality. The course will include economic theory as well as several applications. Applications include the growth miracles of East Asia, India's recent transformation, emerging market crises of the 1990s, aid and development in Africa, and the impact of trade on wages in the United States.

269. International Economics.
Trade patterns and comparative advantage; commercial policy and the distribution of gains from trade; balance of payments problems.

270. International Finance.
Foreign exchange markets; determination of exchange rates; balance of payments; and international asset flows; central bank intervention; international monetary system; European Monetary System (EMS) and European Monetary Union (EMU); international transmission of macroeconomic disturbances.

271. Economics of Human Behavior.
This course applies economic principles to understand various aspects of human behavior that have usually been considered to be outside the realm of economics.

Presents an overview of the international political economy and the role of nation-states within it.

273. Economic Growth and Development.
This course begins with the empirical facts of economic growth and how growth economists have struggled to explain the evidence. Questions that this course addresses include How rich are rich countries? How poor are poor countries? Why are there these differences?

274. Market Design.
This course is a required course for the Economics and Business Strategy major (organizations track) and will be valuable for advanced undergraduates majoring in economics, physics, and mathematics who are interested in pursuing graduate studies in economics. The course is concerned with the design of allocation mechanisms when economic agents have heterogeneous preferences and private information. Examples include the allocation of spectrum licenses to the operators of mobile phone networks, the decision as to whether to provide a public good, the allocation of men to women for dating purposes, and the allocation of students to colleges. Basic results in the mechanism design and auction theories will be covered. Formal concepts used in the course include: mathematical expectation, conditional mathematical expectation, Bayes' rule; the chain and the product rules for differentiation, integration by parts, optimization; extensive and normal form games, the Nash equilibrium, and the Bayes-Nash equilibrium.

282. Introduction to Positive Political Theory.
An introduction to some recent developments in explaining and evaluating government behavior.

286. 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.

288. Game Theory.
(Same as PSC 288)
The course is an introduction to the application of econometric methods. It covers the basic tools of estimation, inference and forecast of cross section, time-series and panel data models. The course emphasizes the intuitive understanding and practical application of these basic tools of econometric analysis.

(Same as HIS 357W/457 and AAS 371)
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.

385W. Atlantic Slave Trade and Africa.
(Same as AAS 375 and HIS 356W/456)
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.

389W. Senior Seminar.
Independent research on an economic problem chosen by the student and approved by a member of the faculty who agrees to supervise the research. Each student must write a substantial paper that reports on the outcome of that research. Class presentation on the progress of this research are also required. Senior status and instructor permission required.

390. Supervised Teaching.
Responsibility for one recitation section and/or for holding office hours under the instructor's supervision. Departmental approval required.

391. Independent Study.
Designed for advanced students seeking to do research beyond what is contained in the regular course offerings. Requires faculty supervisor in the economics department.
394. Internship.
Credit—None
Requires faculty supervisor in the economics department.

The following graduate courses are open to advanced undergraduates with permission of the instructor.

471. Modern Value Theory I.
The foundation of modern microeconomic analysis, including consideration of consumer behavior, the theory of the firm, equilibrium under alternative market structures, and welfare implications.

472. Modern Value Theory.
Introduction to general equilibrium analysis, including modern treatment of existence, stability, and comparative statics properties; elements of capital theory.

475. Macroeconomics.
Reviews the main empirical regularities that characterize economic growth and business fluctuations in market economies. Discusses various theoretical models of the business cycle, as well as the macroeconomic impact of fiscal and monetary policy.

476. Macroeconomics II.
This course continues on with the themes developed in 475: business cycles, economic growth, fiscal and monetary policies. More emphasis is placed on the tools required to do modern macroeconomics: dynamic programming, difference equations, Markov chains, etc. Computational techniques such as linear quadratic and discrete state space dynamic programming, the Coleman algorithm, and parameterized expectations are taught. (No prior knowledge of these techniques is assumed).

481. Introduction to Math Economics.
This course covers the use of optimization theory in economic analysis. The topics covered include finite-dimensional optimization (unconstrained optimization, Lagrange’s Theorem, the Kuhn-Tucker Theorem), the role of convexity in optimization, parametric continuity of solutions to optimization problems, and finite- and infinite-horizon dynamic programming.

Credit—2 hours
Elements of probability theory and statistics, as employed in the econometrics sequence ECO.

484. Introduction to Econometrics.
(Same as APS 514)
Credit—2 hours
Estimation and hypothesis testing in the standard linear model. Linear restrictions; dummy variables; multicollinearity; weighted least squares; specification error.

485. Introduction to Econometrics.
(Same as APS 515)
Supritha Rajan, PhD (North Carolina, Chapel Hill)
Assistant Professor of English

Stephen Schottenfeld, MFA (Iowa)
Assistant Professor of English

Nigel Maister, MFA (Carnegie Mellon)
Senior Lecturer in English

Gordon Rice, MFA (California Institute of the Arts)
Senior Lecturer in English

Curtis Smith, BA (SUNY, Geneseo)
Senior Lecturer in English

Ken Johnson, BA (Seattle)
Lecturer in English

Thomas Gavin, MA (Toledo)
Professor Emeritus of English

Richard M. Gollin, PhD (Minnesota)
Professor Emeritus of English and of Film and Media Studies

Bruce Johnson, PhD (Northwestern)
Professor Emeritus of English

James William Johnson, PhD (Vanderbilt)
Professor Emeritus of English

Jarold Ramsey, PhD (Washington)
Professor Emeritus of English

The Department of English offers undergraduates the chance to explore a wide array of literary works—poetry, drama, fiction, and nonfiction—from the traditions of British, American, and Anglophone literature. There are richly varied offerings in creative writing, in the study of film and other media, and in journalism, rhetoric, and theater. Classes encourage exploratory thinking and conversation, always aiming to increase the students' knowledge, their skills in reading and critical analysis, and their strengths as writers. The department offers opportunities for independent research and internships within both the University and the Rochester community, and maintains close connections with other undergraduate programs in comparative literature, film studies, women's studies, African and African American studies, theater, and literary translation studies.

Students wishing to major in English can choose from four distinct tracks: English Literature; Creative Writing; Theater; and Language, Media, and Communication. Double majoring in English and in another discipline—astronomy or philosophy, political science, or music—is common. Many combinations are possible. The English honors program offers students the chance to write an extended honors thesis—critical or creative—in their senior year. The department also offers minors in four areas: English Literature, Creative Writing, Journalism, and Theater, as well as a diversity of clusters for students seeking to fulfill the cluster requirement in the humanities. Students with questions about any of these programs or possibilities should contact the department's director of undergraduate studies.
BA in English

Requirements
A minimum of 10 courses is required. At least 7 of the 10 must be English courses at the 200 or 300 level.

- Students must take two of the following courses, ideally by the end of the sophomore year:
  - ENG 112. Classical and Scriptural Backgrounds
  - ENG 113. British Literature I
  - ENG 114. British Literature II
  - ENG 115. American Literature

- Students may take one additional course at the 100-level, either a third survey course from the list above (ENG 112, 113, 114, 115) or one of the following “approaches to literary study” courses:
  - ENG 100. Great Books
  - ENG 101. Maximum English
  - ENG 111. Introduction to Shakespeare
  - ENG 116. Introduction to African-American Literature
  - ENG 117. Introduction to the Art of Film

- Of the seven or eight courses remaining at the 200 or 300 level:
  - Two must be in British or American literature before 1800.
  - Two must be in British or American literature after 1800.
  - One must be ENG 380, Research Seminar (from annual list provided by English department), ideally taken in the junior or senior year. ENG 396, Honors Seminar, counts as a Research Seminar (for students in the English Honors Program).

Creative Writing
The Department of English offers a concentration in creative writing for students who want to explore the art of writing and refine their skills in critical reading. Students work intensively on their own imaginative writing (fiction, poetry, and play writing) in conjunction with the study of literature. Students wishing to pursue a Major in English: Creative Writing must apply to the creative writing advisor in the department and receive written approval.

- A minimum of 10 courses is required.
  - Students must take at least four courses in creative writing, as follows:
    - Two courses (8 credits) at the 100 level from among the following:
      - ENG 120. Introduction to Creative Writing
      - ENG 121. Creative Writing: Fiction
      - ENG 122. Creative Writing: Poetry
      - ENG 123. Playwriting
      - ENG 125. Speculative Fiction

- One of the following:
  - ENG 275. Advanced Creative Writing: Fiction
  - ENG 276. Advanced Creative Writing: Poetry
  - ENG 277. Screenwriting

- Students must take two of the following courses:
  - ENG 112. Classical and Scriptural Backgrounds
  - ENG 113. British Literature I
  - ENG 114. British Literature II
  - ENG 115. American Literature

- Students must take four additional English courses at the 200 or 300 level, two of which must be in British or American literature before 1800 and two in British or American literature after 1800.

Students accepted into the honors program in English may write original fiction (a collection of stories or a novella), poetry, or a play to fulfill the requirements for the honors essay. Students choosing this option must have the approval of the creative writing advisor in the English department.

Language, Media, and Communication
The concentration in language, media, and communication is designed to serve students who want to explore the department’s multifaceted array of courses related to the forms of communication. Such courses—in editing, rhetoric, the history of the media of arts and communication, journalism, professional writing, public speaking, debate, etc.—may be of special interest to students who are contemplating careers in such areas as law, nonfiction writing, publishing, print journalism, or electronic journalism. The concentration, however, does not present a narrowly preprofessional curriculum; rather, it is designed to reflect the way English has come to be understood as encompassing a full array of practices from oral to electronic and to highlight the way English, in its objects of study, addresses the history, theory, and analysis of media.

While the requirements below offer a general template for the concentration, majors should devise a specific course of study in close consultation with the language, media, and communication advisor, who must approve the final course of study.

- A minimum of 10 courses is required, at least six of which must be at the 200 or 300 level.
  - Students must take two literature courses, at least one of which must be at the 200 or 300 level.
  - Students must take at least six courses from the following list, at least three of which must be in a single subgroup; this list is not comprehensive, so students should consult with the language, media, and communication advisor for complete and updated information about applicable courses. With permission of the language, media, and communication advisor, students may count up to two
preapproved courses taught in other departments (e.g., art and art history, history) toward the three courses that may be distributed across any of the groups below. Students may also substitute an additional internship (ENG 394) for one of these three courses.

Journalism and Nonfiction Writing
ENG 126. Creative Nonfiction
ENG 130. Seminar in Writing (topical)
ENG 131. Reporting and Writing the News
ENG 132. Feature Writing
ENG 133. Editing Practicum
ENG 138. Journalism Case Studies
ENG 281. Literary Journalism
ENG 282. Editing and Desktop Publishing

Media
ENG 117. Introduction to the Art of Film
ENG 118. Introduction to Media Studies
ENG 255. Film History: Early Cinema
or
ENG 256. Film History: 1929-1959 (can be taken more than once with different topics)
ENG 257. Film History: 1959-Present (can be taken more than once with different topics)
ENG 261. Media Studies (can be taken more than once with different topics)
ENG 267. Topics in Media Studies
ENG 283. Media ABC

Rhetoric and Language
ENG 133. Editing Practicum
ENG 134. Public Speaking
ENG 135. Introduction to Debate
ENG 136. Advanced Debate
ENG 137. Freedom of Expression
ENG 200. History of the English Language
ENG 249. Gender, Writing, and Representation
ENG 284. Orality, Language, and Literacy
ENG 285. Advanced Writing and Peer Tutoring
ENG 286. Presidential Rhetoric
ENG 287. Studies in Translation

- Students must take either an approved ENG 394, Internship in English, or ENG 380, Advanced Seminar (from an annual list provided by the English department). ENG 396, Honors Seminar, counts as an Advanced Seminar (for students in the English honors program).
- Students must take one additional 200- or 300-level English course, from the above.

Theater
The English department offers a special major intended to provide institutional support and recognition to students who want to invest a significant part of their undergraduate careers in theater and theater-related courses, and to furnish such students with credentials reflecting their work in theater.

A minimum of 12 courses (amounting to at least 48 credit hours) in English and theater courses is required.

- Students must take two of the following surveys:
  ENG 112. Classical and Scriptural Backgrounds
  ENG 113. British Literature I
  ENG 114. British Literature II
  ENG 115. American Literature

- Of the remaining courses in literature and theater, 16 hours of credit must be in theater production (either onstage or backstage). Students must work on at least four productions, serving in stage management or as an assistant director for at least one, choosing from the following (spring semester course numbers in parentheses):
  ENG 290 (291). Plays in Production

- Theater students also are required to take 8 hours of credit in theater method and/or performance courses, choosing from the following (spring course numbers in parentheses):
  ENG 133. Playwriting—2 credits
  ENG 170 (171)/270 (271). Technical (and Advanced Technical) Theater
  ENG 172. Intro to Stage Lighting and Sound
  ENG 174 (175). Acting Techniques I (Acting Lab)
  ENG 180. Directing and Directing Lab
  ENG 252. Theater in England
  ENG 360. Special Projects: Theater

Finally, theater students must take 16 hours of credit in literary study courses in British or American literature, two of which must be in literature before 1800, and two courses in dramatic literature.

Additionally, students taking an Internship in Theater (ENG 398), undertaking an Independent Study (ENG 391) whose subject is theater or dramatic research, or enrolled in a standard Advanced Seminar (ENG 380) or Honors Seminar (ENG 396) with a dramatic literature/theatrical focus might also have those classes count towards the theater concentration. Similarly, study abroad options in London and Bath (if allied to dramatic or theatrical work) might count towards this concentration. Other courses in the English department relating to drama and/or theater may, from time to time, be valid additions to this list. See the director of undergraduate studies for details.

In cases where some courses are unavailable, students should consult with the director of undergraduate studies for possible substitutions.

For further information, contact the director of undergraduate studies and/or the artistic director of the Theater Program.
Minor in English

Requirements
The Department of English offers minors in English literature, in writing (with two separate tracks: creative writing or journalism), and in theater. The minors in writing and theater emphasize the practical aspects of the discipline and are open to English majors as well as nonmajors. All four minors stipulate a minimum of six courses, five of which must be taken in residence. No more than two courses in students’ major may be counted toward the minor. Students wishing to minor in English should contact the director of undergraduate studies in English.

English Literature
Six courses are required for the minor:
• ENG 113. British Literature I
• ENG 114. British Literature II
• ENG 115. American Literature
• Four additional courses in British or American literature, three of which must be at the 200 or 300 level

Writing
Students minoring in writing choose one of these tracks:

Creative Writing
Six courses are required:
• Two creative writing courses (8 credits):
  ENG 120. Introduction to Creative Writing
  ENG 121. Creative Writing: Fiction
  ENG 122. Creative Writing: Poetry
  ENG 123. Playwriting.—2 credits
  ENG 125. Speculative Fiction
• At least one advanced creative writing course:
  ENG 275. Advanced Creative Writing: Fiction
  ENG 276. Advanced Creative Writing: Poetry
  ENG 277. Screenwriting
  ENG 275. Seminar in Writing: Fiction
  ENG 276. Seminar in Writing: Poetry
• Additional courses, if needed, to be chosen from the department’s offerings in writing, or from its 200-level and 300-level offerings in literature.

Journalism
Six courses are required:
• ENG 131. Reporting and Writing the News
• ENG 132. Feature Writing
• At least one of the following courses:
  ENG 120. Introduction to Creative Writing
  ENG 121. Creative Writing: Fiction
  ENG 122. Creative Writing: Poetry
  ENG 125. Speculative Fiction
• At least two of the following courses:
  ENG 133. Editing Practicum
  ENG 392. Research Project in Journalism
  ENG 394. Internship
• Appropriate additional courses, if needed, to be chosen from the 200- and 300-level courses in literature or criticism.

Theater
The minor in theater consists of a minimum of 24 credits taken from the following three categories. No more than two courses included in students’ major may be counted toward the minor.
• A student must work on at least two, but no more than three, productions, acquiring at least 8 credits in production and performance courses, either onstage or backstage (spring semester course numbers in parentheses):
  ENG 290 (291). Plays in Production
  ENG 292 (293)/294 (295). Plays in Performance
  ENG 296 (297). Stage Management
• Theater method and performance courses; 8 credits in all (spring semester course numbers in parentheses):
  ENG 123. Playwriting—2 credits
  ENG 170 (171)/270 (271). Technical (and Advanced Technical) Theater
  ENG 172. Intro to Stage Lighting and Sound
  ENG 174. Acting Techniques I (and Acting Lab)
  ENG 175. Acting Techniques II
  ENG 176 (177). Voice and Movement for the Actor—2 credits
  ENG 180. Directing (and Directing Lab)
  ENG 182. Mask, Movement & Mayhem
  ENG 252. Theater in England
  ENG 360. Special Projects: Theater
• Dramatic literature—8 credits (at least two courses):
  ENG 111. Introduction to Shakespeare
  ENG 203. Medieval Drama
  ENG 208. Renaissance Drama: Elizabethan and Jacobean Drama
  ENG 209. Studies in Shakespeare
  ENG 210. Shakespeare
  ENG 214. Restoration and Eighteenth-Century Drama
  ENG 228. African-American Drama
  ENG 235. Modern Drama - a playwright
  ENG 243. Studies in a Major Author
Additionally, students taking an Internship in Theater (ENG 398), Independent Study (ENG 391) whose subject is theater or dramatic research, or enrolled in a standard Advanced Seminar (ENG 380) or Honors Seminar (ENG 396) with a dramatic literature/theatrical focus might also have those classes count towards a minor in theater. Similarly, study abroad options in London and Bath (if allied to dramatic or theatrical work) might count towards a minor. Other courses in the English department relating to drama and/or theater may, from time to time, be valid additions to this list, also. See the director of undergraduate studies for details.

In cases where some courses are unavailable, students should consult with the director of undergraduate studies for possible substitutions.

For further information, contact the director of undergraduate studies and/or the artistic director of the Theater Program.

### Upper-Level Writing Requirement

Because most upper-level English courses are writing intensive, providing extensive attention to writing and revision, students fulfill the upper-level writing requirement as part of the regular requirements for the major. For students doing the standard English concentration, this includes a 300-level research seminar, which serves as a major component of the upper-level writing requirement. For students doing English with an emphasis on creative writing and language, media, and communication, the concentration necessarily includes upper-level courses with writing as their primary subject and medium. Students in English with an emphasis on theater fulfill the upper-level writing requirement as part of their regular requirement of 16 hours of credit in literary study courses.

### Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

#### General Course Information

Courses numbered 200–390 are customarily open to sophomores, juniors, seniors, and qualified first-year students. Students wishing to take any English course numbered 200 or higher should generally have satisfied the College’s primary writing requirement or have taken at least one introductory course (100-level) in literature.

Several of the creative writing and journalism courses require permission of the instructor. Please see the department’s course descriptions each semester for details.

### INTRODUCTORY AND GATEWAY COURSES

#### 100. Great Books.

Provides a close reading of a selection of literary masterpieces. Readings vary from year to year.

#### 101. Maximum English.

A gateway course introducing students to basic concepts and skills, and to the particular features of the English department and its faculty.

#### 111. Introduction to Shakespeare.

A selection of his major plays.

#### 112. Classical and Scriptural Backgrounds.

*(Same as REL 140)*

The great tradition, from Homer, Greek drama, Plato, and Virgil to the Bible and Dante.

#### 113. British Literature I.

An introductory study of early British literature, its forms and themes, and the development of our literary tradition.

#### 114. British Literature II.

Major themes and central ideas in British literature of the eighteenth, nineteenth, and twentieth centuries.

#### 115. Survey of American Literature.

Significant achievements by American writers of poetry, fiction, and other prose in the nineteenth and twentieth centuries.

#### 116. Introduction to African-American Literature.

A survey of African-American literature, fiction, and nonfiction, beginning with the late eighteenth century.

#### 117. Introduction to the Art of Film.

*(Same as AH 112 and FMS 132)*

This course will present the concepts of film form, film aesthetics, and film style, while remaining attentive to the various ways in which cinema also involves an interaction with audiences and larger social structures.

#### 118. Introduction to Media Studies.

*(Same as FMS 131)*

The cultural, aesthetic, and economic history of visual media.

### CREATIVE WRITING COURSES

#### 120. Introduction to Creative Writing.

Introductory workshop exploring multiple genres.

#### 121. Creative Writing: Fiction. Short Story Workshop.


#### 123. Playwriting.

*Credit—2 hours.*

A course devoted to the understanding and execution of dramatic writing that is unique to the theater.
125. Speculative Fiction.
A creative writing course dedicated to commercial and/or literary fiction with an emphasis on science fiction, fantasy, and magic realism.

126. Creative Nonfiction.
The writing and study of such nonfictional forms as memoir and autobiographical narrative.

274. Advanced Creative Writing: Prose.
Workshop that offers students a chance to write creatively in the genres of fiction and creative nonfiction. With focus on the imaginative representation of real places in fiction, travel literature, and autobiography. Read list incl: diverse group of writers - Thoreau, Barry Lopez, Bruce Chatwin, James Joyce, Isak Dinesen, Italo Calvino, and Annie Dillard.

275. Advanced Creative Writing: Fiction.
Seminar in fiction writing. Emphasis on individual development of style.

276. Advanced Creative Writing: Poetry.
Advanced creative writing workshop in poetry. Work by various contemporary poets will provide the framework for explorations into technique and poetic narrative.

277. Screenwriting Workshop.
The primary text for this course is students’ own scripts in progress. The course also examines various professional scripts, both film and television.

375. Seminar in Fiction.
Read short stories by contemporary writers along with fiction by the students in the workshop, and discuss ways writers can sharpen the conversation between text and reader. Also consider editing and reviewing techniques. Students expected to write and revise at least three original stories or three sections of a longer work of fiction.

376. Seminar in Poetry.
An advanced workshop in poetry. Students’ poems are discussed weekly. Creative writing assignments are combined with brief essay responses to a selection of contemporary poetry books.

377. Writing in Other Genres.

LANGUAGE, MEDIA, AND COMMUNICATION

130. Seminar in Writing.
Students read and write essays on a range of topics in the arts and sciences. Topics vary from year to year. The course emphasizes mastery of voice, argument, and rhetorical strategy.

131. Reporting and Writing the News.
A laboratory course (requiring typing) on the fundamentals of gathering, assessing, and writing news.

132. Feature Writing.
A workshop administered by the Department of English and the Gannett Newspapers.

133. Editing.
Practicum seminar on editing a newspaper, with special attention to the Campus Times.

134. Public Speaking.
Practice in effective small-group communication and the presentation of expository and persuasive speeches.

135. Introduction to Debate.
Critical thinking and reasoned decision making through argumentation.

136. Advanced Debate.
Debate theory and practice through varsity-level intercollegiate competition and research.

137. Freedom of Expression.
This course explores the controversies surrounding censorship, free speech, and hermeneutics.

Working in groups, students investigate a specific topic with the goal of producing a comprehensive, readable and visually compelling news report for a variety of media. Involves research, interviews of experts and ordinary people with personal knowledge of the topic. Past projects have examined hunger in Rochester, children’s health issues and the impact of the recession upon resident.

281. Special Topics in Journalism.

LITERARY JOURNALISM

282. Editing and Desktop Publishing.
Students study works as selected by instructor and write their own pieces in this genre.

283. Media ABC.
Provides a historical and critical introduction to the idea of medium and media, including books, paint, electronic files, music, photography, etc.

An inquiry into how literacy capability at different historical moments has affected the uses of texts, performances, and speech genres. Attention is given to literary, sacred, and secular texts.
285. **Advanced Writing and Peer Tutoring.**
This course prepares selected undergraduates for work as writing advisors.

286. **Presidential Rhetoric.**
Critical examination of the public rhetoric and political themes of the modern American presidency.

287. **Studies in Translation.**
A study of the theoretical backgrounds, practical challenges, and creative activity of literary translation.

**MAJOR AUTHORS AND HISTORICAL PERIODS**

**Pre-1800**

200. **History of the English Language.**
The development of the English language from the Anglo Saxon period on up, focusing on texts from representative periods.

201. **Old English Language and Literature.**
Literature written in England before the Norman Conquest. Latin works are read in translation; vernacular works, in the original.

202. **Middle English Literature.**
Poetry, prose, and drama of the thirteenth, fourteenth, and fifteenth centuries, exclusive of Chaucer. Readings in Middle English.

203. **Medieval Drama.**
English drama from its beginnings until 1580, including material from the mystery cycles, moralities, and early Tudor drama.

204. **Chaucer.** *(Same as REL 208)*
The principal works of Chaucer, in their historical and intellectual context. Readings in Middle English.

206. **Studies in Medieval Literature.**
Varying topics relating to the literature and culture of the Middle Ages.

207. **English Renaissance Literature.**
Sixteenth-century literature from Sir Thomas More to Spenser, with some attention to the continental background.

208. **Elizabeth and Jacobean Drama.**
English Renaissance drama through 1642, exclusive of Shakespeare.

210. **Shakespeare.**
Readings of a selection of Shakespeare’s plays.

211. **Milton.**
The works of Milton in their historical and intellectual context.

213. **Studies in Renaissance Literature.**
Varying topics relating to the literature and culture of the Renaissance and Early Modern periods.

214. **Eighteenth-Century Literature.**
The writings of John Dryden, Jonathan Swift, Alexander Pope, Samuel Johnson, and their contemporaries.

215. **Early British Novel.**
The novel from its beginnings to the early nineteenth century, emphasizing such novelists as Defoe, Fielding, Richardson, and Austen.

217. **Studies in Eighteenth-Century Literature.**
Varying topics relating to the literature and culture of England in the period from roughly 1660 to 1800.

218. **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.

**Post-1800**

220. **Romantic Literature.**
Major writers, other than novelists, of the early nineteenth century, with particular emphasis on poets from Blake through Keats.

222. **Nineteenth-Century British Novel.**
Emphasizing such novelists as Dickens, Thackeray, Eliot, and Hardy.

223. **Studies in Nineteenth-Century Literature.**
Varying topics relating to the literature and culture of England in the nineteenth century.

225. **American Criticism and Culture.**
From 1830 to 1865, including Emerson and the transcendental movement, abolitionist writing and slave narrative, representative fiction, and poetry by Poe, Whitman, Melville, Stowe, and others.

226. **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.
From 1913 to 1941, including Eliot, Stevens, Cather, Faulkner, Hemingway, Fitzgerald, O’Neill, W. C. Williams, and others.

228. African-American Drama.
Study of dramatic works by African-American playwrights during the twentieth and twenty-first century.

Varying topics relating to the literature and culture of the Americas.

231. Twentieth-Century British Novel.
The novel from 1900 to the present, emphasizing such novelists as Conrad, Joyce, Woolf, and Lawrence.

A study of English, Irish, and American literature of the early and mid-twentieth century, with a focus on the exploratory work of writers such as W. B. Yeats, James Joyce, Ezra Pound, T. S. Eliot, and Virginia Woolf.

An introduction to representative twentieth-century poetry.

234. Modern Fiction.
Studies in the principle writers of novels and short fiction in the early and mid twentieth century.

235. Modern Drama.
Great modern dramas from Ibsen to Ionesco as reflectors of the main currents in modern thought and feeling.

236. Contemporary Fiction.
Readings in American, British, and Anglophone fiction from second half of the 20th-Century and the beginning of the 21st-Century.

237. Studies in International Literature.
Poetry in English from around 1945 to the present, emphasizing latter-day transformations.

LITERARY MODES AND SPECIAL TOPICS

240. Literary Criticism and Theory.
Study of the methods and conceptual backgrounds of the theoretical study of literature and literary analysis.

241. Lyric Poetry.
A study of the ways of reading shorter poems in English.

242. Topics in Literature.
Readings vary according to subject.

243. Studies in a Major Author.
Intensive study of the writings of a single author or small group of authors from British or American literary traditions.

244. Studies in a Literary Tradition.
A study of a body of works of literature seen through their particular links to a tradition or historical genre.

245. Studies in Literary Mode.
Readings vary according to subject.

246. Detective Fiction.
Examines some of the major authors and books of detective fiction, both British and American, concentrating on the twentieth century.

247. Science Fiction.
Examines a range of science fiction texts and issues, including works by Mary Shelley, H. G. Wells, Isaac Asimov, Robert Heinlein, Samuel R. Delany, and more.

249. Gender, Writing, and Representation.
The interrelation among the gendered dimensions of writing and representation.

250. Literature and Ethnicity.
A review of the interrelated concepts.

Students will study and discuss popular literature.

A four-credit intersession course conducted in London, UK, late December–early January. We’ll see, discuss, write on 16–18 plays. This year includes world premieres of plays by Alan Bennett, John Logan, Lee Hall, and David Hare; Shakespeare’s Twelfth Night, Tennessee Williams’s Cat on a Hot Tin Roof, John Guare’s Six Degrees of Separation, Tom Stoppard and Andre Previn’s Every Good Boy Deserves a Favour, several musicals, and splendid extravaganzas from the National Theatre such as War Horse and Nation, to name a few.

253. The Literature of the Bible.
Narrative and poetic art of selected Biblical texts.

254. Arthurian Traditions.
The origins and later developments of the chivalric romance tradition centering on the legends of King Arthur and his knights.

380. Advanced Seminars.
Advanced seminars focus on a particular body of works (literary or cinematic), a special research topic, or a particular critical or
theoretical issue. One or more extended critical essays will be required. Open to junior and senior English majors. Others may be admitted by permission of instructor.

**FILM AND MEDIA STUDIES**

117. Introduction to the Art of Film.  
*Same as AH 112 and FMS 132*  
This course will present the concepts of film form, film aesthetics, and film style, while remaining attentive to the various ways in which cinema also involves an interaction with audiences and larger social structures.

118. Introduction to Media Studies.  
*Same as FMS 131*  
The cultural, aesthetic, and economic history of visual media.

255. Film History: Early Cinema.  
*Same as FMS 247*  
Intro to history, technology, cultural significance of motion pictures of the “pre-sound” era, screenings of 35mm prints accompanied by live music in the Dryden Theatre. Special attention to major pioneers, Dickson, Porter, Lumière, Méliès, and Griffith, including a variety of internationally produced films selected from the world-famous archival film collection of George Eastman House.

256. Film History: 1929–1959.  
*Same as FMS 248*  
A transnational survey of film history, examining the technical and formal aspects of the medium in its production and exhibition.

257. Film History: 1959–Present.  
*Same as FMS 249*  
This course will explore the developments in world cinema—in industrial, technological, social, and political—in the second half of the sound period (1959 to the present).

259. Popular Film Genres.  
*Same as FMS 251*  
An intensive study of selected types of popular films in their larger cultural context.

260. Studies in Film History.  
Special topics in the history of film, including specific periods, movements, or comparative topics.

261. Film Theory.  
*Same as FMS 255*  
An introduction to the history, the theory, and especially the practice of criticism.

Films from a particular national cinema—British, Japanese, German, French, Italian, and others from various periods.

263. Media Studies.  
This course addresses the history and theory of a range of communications media and visual technologies in science, industry, and popular culture.

264. Studies in a Director.  
Intensive study of the body of work of a single film director.

265. Issues in Film.  
The course takes up particular concepts, ideas, and ideology in film, often spanning periods, nations, and genres.

266. Issues in Film Theory.  
*Same as FMS 244*  
Focus on the technological, cultural, and theoretical histories of film sound throughout the twentieth century. Particular attention to the role of voice (and song) in cinema, as well as the various ways that sound technology and sound practices affect our understanding of narrative space, the body, and social identity.

267. Topics in Media Studies.  
*Same as FMS 259* 

268. Museum Studies.  
Instruction in curatorial and preservation standards for motion picture, video, digital and audio materials with a contextual focus on museum, library and archive institutions.

283. Media ABC.  
Provides a historical and critical introduction to the idea of medium and media, including books, paint, electronic files, music, photography, etc.

**THEATER COURSES**

123. Playwriting.  
Credit—2 hours  
A course devoted to the understanding and execution of dramatic writing that is unique to the theater.

161. Introductory Video and Sound.  
The basic aesthetic and technical elements of video production. Emphasis on the creative use and understanding of the video medium while learning to use the video camera, video editing processes, and the fundamental procedures of planning video projects. Video techniques will be studied through screenings, group discussions, readings, practice sessions and presentations of original video projects.
170/171. Technical Theater.
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.

172. Introduction to Stage Lighting and Sound.
Introduce students to the various elements of theater design. Lighting techniques, sound design, and set design are all covered from time to time.

174. Acting Techniques I and Acting Lab.
Training in the techniques by which individual actors set forth the characters recorded in dramatic texts.

175. Acting Techniques II. Training in the techniques by which individual actors set forth the characters recorded in dramatic texts.

176/177. Voice and Movement for Actor.
This is an introductory course on voice and movement for the actor.

180. Directing and Directing Lab.
Introductory directing techniques for aspiring directors. Exploring the nature of the theatrical events, investigate the nature of conceptualization, visualization, text analysis, action and design as they pertain to the director’s craft. In conjunction with a weekly scheduled lab.

182. Mask, Movement, and Mayhem.
Students expand their range of physical expression and discover new methods to create and tell stories. Techniques from Commedia dell’Arte, clown, Viewpoints, mask-making, animal studies, Laban, stilt-walking. Students discover, develop their own unique movement vocabulary, have a matrix of characters to create their own piece. Students leave with ability to create on their own, trust in their own process, improvise with one another, and find how their bodies are instigator for creativity.

270/271. Advanced Technical Theater.
Investigate technical theater beyond the realms of Eng 170/171 (Technical Theater). Focus on work related to the scenic design and technical production of the semester’s Theatre Program productions. Working in small seminars and one-on-one tutorials. Instructor will assist students in learning more in the chosen technical areas and about problem-solving scenic and technical questions raised by the set/s being built.

One of the foremost acting and voice teachers in South Africa comes to the University for a semester-long residency at the International Theatre Program. Taking both the beginning and advanced acting student through exercises and techniques to develop the actor’s understanding and mastery of vocal techniques to develop the speaking voice and explore dramatic characterization through vocal expression.

290/291. Plays in Production.
Set building, prop and costume development, and publicity for current production.

For actors and stage managers working on the current production.

296/297. Stage Management.
In Stage Management I and/or II will get an in-depth introduction to and immersion in stage managing a theatrical production. In addition, cover all areas of management skills, safety procedures, technical knowledge, and paperwork, students will be expected to serve as an assistant stage manager or production stage manager on one (or both) Theater Program productions in their registered semester. (Fall and Spring)

298. Performance Lab: TBA.
Credit—2 hours
Mandatory acting lab for students in ENG 291.

299. Performance Lab: TBA.
Credit—2 hours.
Mandatory acting lab for students in ENG 293.

360. Special Projects: Theater.
(Fall and Spring)

ADDITIONAL UPPER-LEVEL COURSES

Open to junior and senior English majors. Others may be admitted by permission of instructor.

390. Supervised Teaching.

391. Independent Study.
A course of reading, research, and writing on topics not covered by the existing curriculum, developed between the student and a faculty advisor.

392. Practicum.

394. Internships in English.

396. Honors Seminar.
Special seminar for senior majors accepted into the English honors program. Topics vary each year.
397. Honors Research.

398. Theater Internship: Public Relations and Marketing.

Qualified undergraduates may enroll in advanced seminars at the 400 level by permission of the director of undergraduate studies and the director of graduate studies in English and the instructor. Limited to students completing the English honors program.

The Film and Media Studies Program offers an interdepartmental major leading to a bachelor’s degree. A minor in film and media studies is also available. The film and media studies major offers students an opportunity to explore motion pictures, television, and the electronic arts as art forms and cultural phenomena. It consists of specific courses offered by participating departments, and provides the opportunity for screening and analysis of centrally important works in the history of cinema and media from the core collection in the Film and Media Studies Center. Twenty or more film courses are offered annually by various departments; a list is made available each semester in time for preregistration. The program offers a variety of clusters in film and media studies.

The Film and Media Studies Program also enjoys a close relationship with George Eastman House. All University students have free access to the museum and library on presentation of student identification. Important film screenings and special events are offered several nights a week at the Dryden and Curtis Theatres. The archival resources of the museum are also available for coursework and for special projects. In 2004, the University of Rochester and George Eastman House initiated a joint MA program. Students in the L. Jeffrey Selznick School of Film Preservation at the Eastman House have the option of enrolling in a two-year graduate program leading to a Master of Arts degree.

Film and Media Studies

Professor

Douglas Crimp, PhD (CUNY)
Fanny Knapp Allen Professor of Art History and Professor of Visual and Cultural Studies

Morris Eaves, PhD (Tulane)
Professor of English

Claudia Schaefer, PhD (Washington University, St. Louis)
Rush Rhees Professor and Professor of Spanish

Sharon Willis, PhD (Cornell)
Professor of Art History and of Visual and Cultural Studies

Associate Professor

Joanne Bernardi, PhD (Columbia)
Associate Professor of Japanese

Elizabeth Cohen, MFA (Rhode Island School of Design)
Associate Professor of Art

George Grella, PhD (Kansas)
Associate Professor of English and of Film and Media Studies

Sarah Higley, PhD (California, Berkeley)
Associate Professor of English

Allen C. Topolski, MFA (Pennsylvania State)
Associate Professor of Art

Assistant Professor

Jason Middleton, PhD (Duke)
Assistant Professor of English

Greta Niu, PhD (Duke)
Assistant Professor of English
through the Department of English. For more information, contact the Film and Media Studies director or the graduate director of the English department.

**BA in Film and Media Studies**

There are many career opportunities open to students of film and the media arts. Students go on to film or television school, pursuing graduate work in producing, directing, editing, cinematography, screenwriting, acting, and other creative aspects of media. Others choose to pursue the graduate study of media history, theory, and criticism in master’s or doctoral programs. Media law and business also present exciting opportunities for postgraduate study. A major in film and media studies can also lead to exciting careers in print and media journalism, arts and museum management, film preservation and curating, library science, and multimedia production.

The major consists of 12 courses organized in the following categories. Students are admitted to the major on recommendation of the major advisor. The major includes an intensive writing requirement, which is satisfied by successful completion of two upper-level writing courses. Each semester the program designates several such courses.

- One of two core courses:
  - FMS 131. Introduction to Media Studies
  - FMS 132. Introduction to Film Studies (Introduction to the Art of Film)
- One course in film/media history
- One course in international or transnational film/media
- One course in film/media theory
- Two courses in film/media analysis and criticism
- One course in media production
- Five elective film/media studies courses (two of which must be at the 200 or 300 level)

**BA in Media Production**

Students interested in media production are encouraged to seek out courses that deepen their background in the arts—especially in studio art, theater, and creative writing—and to integrate them into their program of study. Students majoring in film and media studies may also elect to follow a special major in media production as an alternative to the standard program of study. The goal of the special concentration is to prepare students with the basic, creative background and the practical experience they need either to pursue the postgraduate study of film and television production or multimedia authoring, or to begin careers in these industries. The special major in media production comprises 12 courses, organized in the following manner:

- One of two core courses:
  - FMS 131. Introduction to Media Studies
  - FMS 132. Introduction to Film Studies
- One course in film/media history
- One course in international or transnational film/media
- One course in film/media theory
- Two courses in film/media analysis and criticism
- One course in media production
- Five elective film/media studies courses (two of which must be at the 200 or 300 level)
- One course in media theory
- One course in media history
- One course in media analysis and criticism
- One upper-level course (200 level or above in a nonproduction area)
- Five courses in production-related areas
  - The five courses in production-related areas may include work in creative writing, theater, photography, and the digital arts as well as media production.

Double majoring in film and media studies and another field is also encouraged, though not more than two courses may be proposed in common for the two majors.

Film and media studies concentrators may, if they wish, include in their senior year an independent reading or research course, FMS 391, or an independent project that calls upon the knowledge and discrimination acquired while completing these requirements.

FMS 394, film internships at television stations and local industries, as well as abroad, are open to film students under the sponsorship of the Film and Media Studies Program. The director can also recommend many other study abroad programs for a semester or a full year. Contact the director for more information. For information about internships abroad, contact the Center for Study Abroad.

**Minor in Film and Media Studies**

A minor in film and media studies requires six courses as outlined below.

- FMS 132. Introduction to the Art of Film
- FMS 131. Introduction to Media Studies
- One course in film/media history
- One course in either film/media theory or analysis and criticism
- Three additional film/media studies courses chosen in consultation with the faculty advisor. These courses may include three production-related courses thus comprising in effect a minor concentration in media production.

**Upper-Level Writing Requirement**

Film and media majors will take two designated upper-level writing emphasis courses in the major. Please contact the program office for a list of designated courses.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.
ART AND ART HISTORY

**213. Race and Gender in Popular Film.**

This course explores Hollywood’s fascination with race and gender as social issues and as spectacles. In particular, we will focus on the ways that social difference have become the sites of conflicted narrative and visual interactions in our films. To examine competing representations of racial difference and sexual difference in US culture, we analyze popular films from the 1950s to the present.

**248. Film History: 1929–1959.**

This course provides a transnational survey of film history, examining the technical and formal aspects of the medium in its production and exhibition. As we explore the development of cinema during this period, we will address a number of aesthetic and technological issues. For example, how did the development of sound technology affect film form? How did it affect cross-cultural cinematic exchange? What is the significance of genre across various film traditions? What did the studio system contribute to Hollywood’s success in the international market? How did immigrant and exiled film personnel shape the industries they joined? Weekly screenings and film journals required.

**264. Studies in a Director.**

A course in the works and career of an outstanding and identifiable film director: Hitchcock, Warhol, Huston, Bunuel, Renoir, etc.

**270. Films of Jean-Luc Godard.**

Survey the career of Jean-Luc Godard from *Breathless* (1959) to *In Praise of Love* (2001) through close analysis of his films and range of critical responses. Explore numerous issues Godard places before us as spectators and critics.

**292. History of French Cinema.**

Survey the history of French cinema from its early experiments through the “Tradition of Quality” to the moment immediately preceding the emergence of the New Wave. Study films selected from the work of the following directors: Lumière, Melies, Gance, Dulac, Leger, Clair, Vigo, Renoir, Carne, Ophuls, Pagnol, Clement, and Bresson. Readings will include contemporary critical and theoretical discussions, as well as historical analyses. Knowledge of French is helpful but not necessary.

ENGLISH

**131. Introduction to Media Studies.**

This course provides a broad overview and introduction to media. We will cover histories of different types of media (internet, radio, audio recordings, television, cable, film, journalism, magazines, advertising, public relations, etc.) as well as various theories and approaches to studying media. No prior knowledge is necessary, but a real interest and willingness to explore a variety of media will come in handy. Occasional outside screenings will be required (but if you cannot attend the scheduled screenings, you may watch the films on your own time through the Multimedia Center reserves.)

Students will be evaluated based on assigned writing, classroom discussion leading, participation, short quizzes, midterm exam and final exam.

**132. Introduction to the Art of Film.**

As an introduction to the art of film, this course will present the concepts of film form, film aesthetics, and film style, while remaining attentive to the various ways in which cinema also involves an interaction with audiences and larger social structures.

**228. Digital Media.**

This course examines the histories, presents, and futures of digital media, particularly video games, computer generated images (CGI), and the Internet (including convergences with the media of sound recording, radio, television, and film). One of the underlying concepts we will explore is the relationship between digital media and globalization. We will also investigate how communities are constructed and transformed by their participation in digital media. Some experience with media studies is helpful but not required. Students will write blogs, academic essays, and have the option of producing an audiovisual mashup or other digital creation in lieu of one written assignment.

**232. Popular Film Genre: the Horror Film.**

This course examines major critical issues surrounding the horror genre, through close study of Classical Hollywood, post-Classical, and international horror films, and readings in critical theory. Issues to be explored include boundary transgression and bodily abjection in the construction of the horror monster; gender, pregnancy, and the monstrous feminine; social Otherness (race, class, sexuality) as monstrosity; the figure of the serial killer and the shift from classic to modern horror; the grotesque and the blending of comedy and horror in the zombie film; international horror (especially Japan) and cross-cultural influences with Hollywood. As a research seminar, the course will involve the development of a substantial research project.

**247. Film History: Early Cinema.**

Introduction to the history, technology, and cultural significance of motion pictures of the “pre-sound” era, with screenings of 35mm prints accompanied by live music in the Dryden Theatre. Special attention will be paid to the major pioneers, Dickson, Porter, Lumière, Méliès, and Griffith, but the course will include a variety of internationally produced films selected from the world-famous archival film collection of the GEH. Discussion sessions will cover the origins and development of the motion picture industry and its leading genres up to the general introduction of movies with pre-recorded music, sound and dialog, beginning in 1927. Broad issues relating to the transformation of American and world popular entertainment forms and traditions, in relation to the established performing arts of the period, will also be covered. Relevant connections to preserving the
world’s film heritage will be highlighted and the film restoration facilities of the Motion Picture Department will be visited this course.

249. Film History: 1959–Present.
This course will explore developments in world cinema—industrial, technological, social, and political—from 1959 to the present. It will consider aesthetic and technical issues, including questions like the following. What brought about the collapse of the Hollywood studio system? What’s new about the French New Wave? What do we mean by “Third Cinema”? How do different national cinemas influence each other? Weekly screenings and film journals required.

FILM AND MEDIA STUDIES

161. Introduction to Video and Sound.
This course introduces the basic aesthetic and technical elements of video production. Emphasis is on the creative use and understanding of the video medium while learning to use the video camera, video editing processes and the fundamental procedures of planning video projects. Video techniques will be studied through screenings, group discussions, readings, practice sessions and presentations of original video projects made during the course.

390. Supervised Teaching.
391. Independent Study.
392. Special Topics.
393. Senior Project.
394. Internship.

MODERN LANGUAGES AND CULTURES


243. Film as Object.
Film Studies involves the critical analysis of the pictorial and narrative qualities of motion pictures, film theory, and film history, understanding film as both industry and creative art. This course unconventionally focuses on the tangible object at the origin of the onscreen image, and what we can learn about the social, cultural and historical value of motion pictures and national film cinemas through an understanding of Film as an organic element with a finite life cycle. Focus is on the photographic element, but includes a consideration of alternative capture media. Enrollment limited to 15.

271. Asian American Literature and Film.
Focus on the literary genres of APA works and cinematic texts from the past century. Includes works by Chinese American, Filipina American, Indian American, Korean American, Japanese American, and Vietnamese American authors. Some prior knowledge of 20th century U.S. literature or Asian Pacific Islander American history helpful, but not necessary.

278. Mexican Film.
Visitors to Mexico already have Hollywood versions of the country in their heads, but the ‘real’ Mexico is a much more complex place. Archetypes of tough hombres, renegade outlaws, dark and sultry women, or beach bums lolling under the hot sun fall by the wayside when Mexican cinema introduces the grittier and much more varied realities of the contemporary nation. This course explores both historical antecedents and contemporary visions. It includes films by directors such as Spanish exile Luis Buñuel, Alejandro González Iñárritu, Jaime Humberto Mosillo, Alfonso Cuarón, Carlos Reygadas, Raúl Ruiz, María Novaro, and other box office favorites. From Robert Rodríguez’s Machete, to Desperado, Once Upon a Time in Mexico, and, of course, Y tu mamá también, Entre Pancho Villa y una mujer desnuda, and La ley de Herodes, we explore images of Mexican culture. Course taught in English, but work may be written in Spanish for Spanish credit.

281. Spanish Film.
Critical analysis of recent Spanish cinema within its cultural contexts. Beginning with the early post-Civil War period, focus is on film as the narrative representation of radical changes and transitions in Spanish society. Considers the translation of other media (literary, theatrical, etc.) into film and the problematic relationship between historical reality and the aesthetics of cinema.

284. Russia Goes to the Movies.
The dawn of the age of movies coincided with the Russian Revolution, and film was Lenin’s favorite art form. The course surveys Russian film from the beginnings to the present. The course investigates the major role that cinema played in shaping the national and political identity of the Soviet Union, and looks at what was artistically interesting and popular about these films, some of whose directors, like Eisenstein and Tarkovsky, are among the world’s most influential filmmakers.

This course explores the relationship between film and revolution in West German film from 1965 to the present.

289. Avant-Garde Film.

290. Nazi Culture.
This course uses the films of the Third Reich to examine the parameters of Nazi culture. It examines such diverse aspects as the Leader Principle, gender roles, racial hygiene, anti-Semitism, mass culture, propaganda, and visions of history. Films are analyzed both in terms of their aesthetics as well as the social and historical context of their production.
293. French Cinema: the New Wave.
A study of French film from its beginnings through the New Wave.

A survey of Japanese cinema since its origins, this course examines the major issues, trends and moments that make up its history. Content varies according to the particular time span offered (origins to 1960s or origins to present), but significant topics addressed include: silent film and popular culture; the import market and its influence; prewar, wartime and postwar censorship; popular genres; animation; the early international festival circuit; the art film and New Wave; and patterns of global distribution and exchange. Course taught in English (additional instruction in Japanese available for majors).

298. The Samurai.
“The Samurai” will examine the emergence of the warrior class in the 10th and 11th centuries, its evolution from rustic warriors to medieval military power holders, and military bureaucratic administrators. The class will include readings on the history, literature, philosophy, and religion of the samurai class. Films treating the popular imagery of the samurai will be projected in class. Various representations of the samurai will be compared and contrasted.

299. Atomic Creatures: Godzilla.
A study of the phenomenon that generated and helped define the Japanese kaiju eiga (monster film) genre: the Godzilla series that began with the original film by Inoshiro Honda (Gōjira, 1954), and its better-known U.S. remake (Godzilla, King of the Monsters, 1956). The larger context of the course is a critical investigation of the science-fiction/horror/creature feature film generated in the late 1940s by the dawn of the nuclear age. The course will begin with a sampling of seminal non-Japanese titles that created a paradigm for the Godzilla film, and will address the historical and social contexts for the series erratic trajectory since 1954. Students are responsible for assigned readings and are required to attend screenings.

STUDIO ART

205. Introductory Digital Art.
For the purpose of this course, the computer and software will be a medium of artistic production. Students will use writings and readings on contemporary art practice and theory to create work within the framework of contemporary digital art. Software, namely Adobe PhotoShop and Macromedia Dreamweaver, will be the medium for materializing conceptual ideas. Prior experience with the software used in this course is not required. Enrollment limited at 10.

256. Advanced Digital Art.
Looks at contemporary digital art and new media and practice using readings, visiting collections, galleries, and production of photographic work.

257. Advanced Video and Sound.
Prerequisites: FMS 161/SA 161/ENG 161 and permission of instructor.
In this advanced production course, video and sound will be considered as independent art forms as well as part of video installations. Students will produce experimental videos and sound pieces. They will also explore the use of these mediums when combined with two- and three-dimensional materials in real time. This course will cover both analogue and digital formats.
History

Professor

Daniel H. Borus, PhD (Virginia)
Professor of History; Director of Graduate Studies

Theodore M. Brown, PhD (Princeton)
Professor of History, of Community and Preventive Medicine, and of Medical Humanities

Stanley L. Engerman, PhD (Johns Hopkins)
John Munro Professor of Economics and Professor of History

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

Richard W. Kaeuper, PhD (Princeton)
Professor of History

Elias C. Mandala, PhD (Minnesota)
Professor of History

Dorinda Outram, PhD (Cambridge)
Gladys I. and Franklin W. Clark Professor of History

Joan S. Rubin, PhD (Yale)
Professor of History

Thomas P. Slaughter, PhD (Princeton)
Arthur R. Miller Professor of History

David A. Walsh, PhD (Minnesota)
Professor of Art History and of History

Stewart A. Weaver, PhD (Stanford)
Professor of History; Chair of the department

Robert Westbrook, PhD (Stanford)
Joseph F. Cunningham Professor of History

Associate Professor

Daniel Beaumont, PhD (Princeton)
Associate Professor of Arabic Languages and Literature

Gerald Gamm, PhD (Harvard)
Associate Professor of Political Science and of History

Larry E. Hudson, PhD (Keele University, UK)
Associate Professor of History

Michael J. Jarvis, PhD (William and Mary)
Associate Professor of History

Matthew E. Lenoe, PhD (Chicago)
Associate Professor of History; Director of Undergraduate Studies

Jean Pendersen, PhD (Chicago)
Associate Professor of History and of Humanities, Eastman School of Music

Assistant Professor

Dahpon Ho, PhD (University of California, San Diego)
Assistant Professor of History

Elya Zhang, PhD (University of California, San Diego)
Assistant Professor of History

Professor Emeritus

Milton Berman, PhD (Harvard)
Professor Emeritus of History

William B. Hauser, PhD (Yale)
Professor Emeritus of History

Jesse T. Moore, PhD (Pennsylvania State)
Professor Emeritus of History

John J. Waters, Jr., PhD (Columbia)
Professor Emeritus of History

Mary Young, PhD (Cornell)
Professor Emeritus of History

Graduate students serve as teaching assistants in large lecture courses.

The Department of History offers programs of study leading to the BA degree and the BA degree with honors (and, on the graduate level, to the MA and PhD 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 interests. The history concentration is valuable not only for those considering the historian’s vocation, but also for those pursuing careers in law, secondary school teaching, politics, and communications, among others.

The department also offers 16 clusters for nonmajors to fulfill the social science divisional requirement in the Rochester Curriculum. These clusters consist of carefully selected sets of courses and include both geographical (e.g., American History) and topical (e.g., War and Revolution) groupings.

The department offers a wide range of courses in its undergraduate program encompassing 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 little preparation in history. In addition, the faculty offer 300-level seminars and courses designed for students interested in exploring more specialized historical problems (200-level courses designated with a “W” and all 300W courses fulfill the upper-level writing requirement).

All students majoring in history have a faculty advisor. The choice of that advisor is based on the students’ particular interests in history and is made in consultation with the director of undergraduate studies. The advisor helps prospective majors plan their programs. In addition, advisors are a resource for information on courses, on making changes to a major program, on special opportunities in the major (honors, internships, etc.), and on opportunities for further study and work after graduation.

For the most current information about the Department of History and the faculty, please visit www.rochester.edu/College/HIS.

Advanced Placement

Advanced placement credit is granted for scores of 4 or 5 on the American history, European history, or world history exams. Credit is granted for only one AP course. This credit is an elective credit and may not be used to satisfy the geographical or chronological distribution requirements in the major or minor or to satisfy the focus requirement in the major.
International Baccalaureate Credit

International Baccalaureate credit will be granted should a higher-level exam score of 6 or better be received. No credit is granted for subsidiary level exams. This credit is an elective credit and may not be used to satisfy the geographical or chronological distribution requirements in the major or minor or to satisfy the focus requirement in the major.

Note: Students may not receive more than a total of 8 elective credits for AP and IB exams.

BA in History

Before admission to a major in history, students must satisfactorily complete at least two history courses. Students may then count these courses toward fulfillment of the history major requirement, which consists of a total of 10 courses (or 40 credit hours), including:

- A minimum of six courses (or 24 credit hours) taken from members of the history department faculty. No more than four courses in the major may come from courses taken elsewhere, study abroad courses, AP credit, IB credit, or cross-listed courses taught by faculty not formally associated with the Department of History. (Please note that some HIS courses are offered by faculty in other College departments and will not count toward the six-course minimum).
- Transfer students majoring in history are required to take a minimum of five courses in the department, thus meeting half the major requirements in residence.

- A minimum of one course in at least three of the following geographical areas—Africa, Asia and the Pacific, Europe, Latin America, the Middle East, and the United States; a course covering more than one geographical area (for instance, a course on European imperialism) may nevertheless only count for one geographical area, which students designate.

- A minimum of two courses in each of two chronological periods—pre-1800 and post-1800; courses with substantial coverage of both periods may only count for one, which the students designate.

- Five history courses (or 20 credit hours) in an area of focus. In addition to nations or regions, students may choose from the following focus areas organized around a theme or approach—African and African-American History, Cultural and Intellectual History, Economic and Social History, History of Science and Medicine, Global Perspectives, Women’s History; students may also choose to design a focus individually, in consultation with their departmental advisor.

- Two upper-level writing (“W”) history courses, one of which must be on the 300 or 300/400 level and one of which must be in the students’ area of focus.

- All of these specific requirements are included within the 10 required courses, and overlap is allowed between requirements—for instance, a course on Traditional Japan may count both as a course in the geographical area of Asia and the Pacific and as a course in the pre-1800 chronological period.

- Students double majoring in history and another department or program in the humanities or the social sciences divisions may, with the permission of the director of undergraduate studies, use either one or two courses (a maximum of 8 credits) from their other major toward the fulfillment of the history major; double majors must, however, still meet the geographical and chronological distribution requirements and the 300-level seminar requirements with history courses.

- If study of a foreign language is pertinent to students’ focus areas (e.g., Japanese to Asian and Asian-American history, or Russian to European history) and is used in research for history courses, then students may, with permission of the director of undergraduate studies, count up to two courses (a maximum of 8 credits) of language study toward the history major; students using foreign language credits within the major must still meet the geographical and chronological distribution requirements, the 300-level seminar requirements, and the focus area requirement with history courses. (Please note: students using foreign language study to satisfy a humanities cluster may only overlap ONE course in the cluster with the history major.)

Honors in History

Requirements

Students are invited to apply to the honors programs. Invitations are issued at the beginning of the senior year and are based on grade point average in the department and on progress toward finishing department requirements. To graduate with honors in history, students must complete the major program; complete two 300W-level history courses and HIS 391W (independent study devoted to thesis preparation); have a departmental cumulative grade point average of at least a 3.7; and the completion of a distinguished research paper under the direction of a faculty advisor. The thesis must be of at least A– quality. Students do not receive honors for a thesis that does not meet this minimum standard. The 2-credit Honors Research Seminar (HIS 398) is encouraged.

Requirements for Distinction in History

To graduate with distinction in history, students must have a GPA of 3.7 in the major and to receive highest distinction in history, students must have a GPA of 3.8 in the major.

Minor in History

The minor in history consists of a total of six courses (or 24 credit hours), including:

- A minimum of four courses (or 16 credit hours) taken from department faculty; no more than two courses (or 8 credit hours) may come from AP credit, IB credit, transfer courses, study abroad courses, or cross-listed courses taught elsewhere, study abroad courses, AP credit, IB credit, or cross-listed courses taught by faculty not formally associated with the Department of History. (Please note that some HIS courses are offered by faculty in other College departments and will not count toward the six-course minimum).

- Transfer students majoring in history are required to take a minimum of five courses in the department, thus meeting half the major requirements in residence.

- A minimum of one course in at least three of the following geographical areas—Africa, Asia and the Pacific, Europe, Latin America, the Middle East, and the United States; a course covering more than one geographical area (for instance, a course on European imperialism) may nevertheless only count for one geographical area, which students designate.

- A minimum of two courses in each of two chronological periods—pre-1800 and post-1800; courses with substantial coverage of both periods may only count for one, which the students designate.

- Five history courses (or 20 credit hours) in an area of focus. In addition to nations or regions, students may choose from the following focus areas organized around a theme or approach—African and African-American History, Cultural and Intellectual History, Economic and Social History, History of Science and Medicine, Global Perspectives, Women’s History; students may also choose to design a focus individually, in consultation with their departmental advisor.

- Two upper-level writing (“W”) history courses, one of which must be on the 300 or 300/400 level and one of which must be in the students’ area of focus.

- All of these specific requirements are included within the 10 required courses, and overlap is allowed between requirements—for instance, a course on Traditional Japan may count both as a course in the geographical area of Asia and the Pacific and as a course in the pre-1800 chronological period.

- Students double majoring in history and another department or program in the humanities or the social sciences divisions may, with the permission of the director of undergraduate studies, use either one or two courses (a maximum of 8 credits) from their other major toward the fulfillment of the history major; double majors must, however, still meet the geographical and chronological distribution requirements and the 300-level seminar requirements with history courses.

- If study of a foreign language is pertinent to students’ focus areas (e.g., Japanese to Asian and Asian-American history, or Russian to European history) and is used in research for history courses, then students may, with permission of the director of undergraduate studies, count up to two courses (a maximum of 8 credits) of language study toward the history major; students using foreign language credits within the major must still meet the geographical and chronological distribution requirements, the 300-level seminar requirements, and the focus area requirement with history courses. (Please note: students using foreign language study to satisfy a humanities cluster may only overlap ONE course in the cluster with the history major.)
by faculty members not associated with the Department of History.

- A minimum of one course from at least two of the following geographical areas: Africa, Asia and the Pacific, Europe, Latin America, the Middle East, the United States.
- A minimum of one course from each of two chronological periods: pre-1800 and post-1800.

**Upper-Level Writing Requirement**

History majors fulfill the College upper-level writing requirement by taking two history courses designated with a “W.” One of these two upper-level writing courses must be at the 300 or 300/400-level. These two seminars are included within the total of 10 courses (40 credit hours) required for the major in history.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**INTRODUCTORY COURSES**

100. *Gateway to History.*

An introduction to historical research and inquiry for prospective and new history majors. Each section of this course will be organized around a particular theme - please see term description for details.

102. *Early Europe.*

This course surveys aspects of European political, social, cultural, and economic history from prehistoric times to c. 1500 C.E. Students will examine the various societies of the European continent, and focus on the following themes: perceptions of identity in Europe, the conduct and impacts of warfare, networks of trade and economic activity, the development of state institutions, and the habits of daily life. Students will assess these themes through analysis and discussion of art, architecture, literature, and historical writings, with students' written work concentrating on art history, history, and literature.

103. *The West and the World since 1492.*

This course focuses on encounters between Europeans and people of other cultures from 1492 to the 1970s, on the development of the ideals of individual rights and popular sovereignty in Europe, and on the spread of the industrialized nation-state as an organizational model for societies throughout the world. Episodes and topics we may cover include the Spanish conquest of Mexico, English Civil Wars of the 17th century, the French Revolution and human rights, Japanese response to Western imperialism, and stalinism.

105. *Traditional Japan.*

This lecture course will cover Japanese history from the beginning to around 1850. Emphasis will be on the changing nature of political authority, the changing roles of the aristocrats, samurai warriors, and commoners, the emergence of new cultural forms, and the transformation of traditional Japanese society. Readings will include literature, diaries, political, social, and economic history, and material on Japanese women. Several films will be shown in conjunction with the course.


This course uses film, literature, and historical studies to understand the transformation of African societies during the colonial era and its neocolonial aftermath. It maps out the forging of new national identities, creation of wage laborers, restructuring of rural communities, and changing power relations between women and men, the young and old. Students will also explore how African men and women, from their homes and workplaces, and as part of nationalist and national liberation movements during and after the Cold War, have sought to redefine their place in the global economy amidst new opportunities and challenges presented by environmental degradation, the HIV/AIDS pandemic, hunger, international debt, and China's growing thirst for the continents seemingly inexhaustible natural resources.

110. *Introduction to African-American Studies.*

Drawing on the disciplines of History, Anthropology, and Psychology, this course will introduce students to the interdisciplinary approach to the examination of the black experience in America.

116. *Introduction to History of Poland.*

The aim of this course is to present a general outline of the cultural, political, as well as social and economic history of Poland in the context of Europe. The complexity of a thousand years of Polish history will be presented in an accessible way. We will also explore the themes of European historical diversity and European identity in the context of Poland.

120. *Introduction to Historical Studies.*

This course is intended for students new to the study of history at the college level. It explores what historians do, how they do it, and how students can hone their own skills.


A study of the discovery, settlement, and development of America, 1580-1763.


Jefferson, Jackson, party formation, popular culture, and sectionalism.
147. Industrial America, 1865–1929.
Changes in national life brought about by the sustained expansion of American industry.

148. Recent America, 1929–Present.
Causes and consequences of the Great Depression.

150. Russian Civilization.
Russian civilization from its beginnings a thousand years ago to the present day. Each unit covers historical and cultural background as well as literary texts. National “myths” that govern the Russians’ understanding of their history and culture are examined. Traditional tensions in Russian civilization which prevail today, such as those between chaos and order, foreign influence and a strong national identity, innovation and tradition, and between radical skepticism and faith, are analyzed. Readings include Russian fairy tales and saints’ lives, excerpts from the autobiography of the 17th c. heretic Avvakum, tales by Pushkin and Gogol, one of Dostoevsky’s most powerful and influential novels (Devils: the Possessed), and a wide range of materials from the 20th c.

151. Imperial Russia.
This course examines the history of the Russian Empire from the reign of Peter the Great (1692-1725) to the revolutions of 1917. Students will read primary sources in translation, academic articles, and a survey text. About one-half of class time will be devoted to discussion of the readings. Topics will include Peter’s westernization of Russian elites and the costs thereof, the Pugachev rebellion of 1773-1775, the spread of Enlightenment ideals to Russia during the Napoleonic Wars, the abolition of serfdom, Sergei Witte’s industrialization drive, socialist movements in Russia, World War I, and the causes of the revolutions of 1917.

153. Russia Now.
Credit—2 hours
Students will follow current events in Russia through the internet, newspapers, magazines, and other sources (including satellite broadcasts when available). Along with a general attention to current events, each student will follow a particular area of interest (e.g., national identity, the market economy, politics, health issues, crime, culture, foreign policy) throughout the term, do background work on this topic and write it up towards the end of the term. Students who read Russian will be encouraged to use available sources in that language. This course is designed to (1) familiarize students with the most important issues facing Russia today and the historical/political/cultural context in which to place them; (2) to acquaint students with a variety of resources from the US, Russia, and a number of other countries and the different perspectives these sources may give on one and the same issue. May be taken more than once for credit.

154. Russia Now.
In this expanded 4-credit version of the 2-credit “Russia Now” course, students will follow current events in Russia through print and electronic sources, and write two short essays and one longer research paper.

155. African-American History I.
After examining the primary features of pre-European African society we will assess the disruptions triggered by European arrival. A discussion of the “Middle Passage” – the transportation of enslaved Africans to North America—and the Africans’ adjustment to their new environment will compose the first section of the course. We will then focus on the process of “Americanization” as the Africans became African-Americans. The struggle for freedom and citizenship will conclude our survey. The course readings will be selected from autobiographies by African and African-American authors, and some brief selections from secondary texts. Using the autobiographies as historical source material, we will examine the values and cultural practices of Africans in America, and the ways in which African-Americans adapted to and shaped American life and culture.

156. African-American History II.
This course will examine African-American history from 1900 to the present. The course will begin by reviewing the legacy of slavery and Reconstruction for African Americans. We will then discuss institution building in the early twentieth century, the Great Migration of African Americans to northern cities, and political activism during World War II. The course will also examine the post-war Civil Rights movement, analyzing both the legacy of nonviolence in the South and the emergence of black power in the North. Finally we will discuss contemporary issues such as affirmative action, black political power, and cultural conflict. Throughout the course we will be attentive to gender and class relations within the African-American community, and the impact of African American activism on American history more broadly.

This course examines the struggles to control Indochina among the French, Vietnamese, and Americans in the 20th c., with special emphasis on the consequences for the social and political life of all three peoples.

169. The Transatlantic Twenties.
An introduction to the history of modern art, music, film, dance, and literature, which emerged in the context of political, social, and cultural developments in Europe and the United States during the years following World War I. Emphasis will be on the two-way traffic in ideas across the Atlantic, with special attention to Germany, France, Great Britain, and America.
172. Indians and Other Americans.

The United States was once Indian country. Parts became English, French, or Spanish, then American. The result of English and European settlement and the succession of the United States to the right of governing their territories was both an intricate set of cultural exchanges, often beneficial to both parties, and the dispossession of the Indians, who kept about five per cent of the land—most of it what no one else wanted. In addition to examining the processes of contact and dispossession, the course will consider the many stories, or “discourses,” people have used to interpret contact and dispossession, among them, Indians as Vanishing Americans, Indians as Victims, Indians as Agents, Indians as Privileged Characters, Indian Holocaust and Survival.


American history has been largely shaped by wars. This course will survey the history of American wars; the military, naval, and civil institutions that have been created to serve the changing needs of national defense; and the citizen-soldiers who have preserved the liberty of the Republic.

184. Modern Japan.

The course will focus on the modern history of Japan from 1850 into the 1990s. The transformation of Japan from a traditional into a modern, industrial society with its costs, disruptions, and benefits will be emphasized. The emergence of Japan as a major power in East Asia, its expansion into Korea and Manchuria, and the growing conflict with the West, leading to the Pacific War, will also be covered as will Japanese postwar political, social, and economic change.


Exploration of crime and criminal persecutions as historical constructions; students look at some of the most famous European crimes and/or trials since the Middle Ages throughout the twentieth century.

INTERMEDIATE COURSES

200. Introduction to Archaeology.

This course introduces the student to the field of archaeology through three units of study: (1) the history of excavation from ancient to modern times, (2) the techniques of excavation and the analysis of material remains, and (3) modern theories of cultural interpretation of archaeological sites. We will discuss the value of archaeological approaches to the fields of anthropology, history, architectural and art history, religious and classical studies. Much of the instruction will be illustrated by case studies of sites; although the view will be global, there will be a concentration in Old World material from prehistory to the early modern period. Students will be required to write three essays, with subjects selected from each of the three course units.

201. The Third World.

The concept of a Third World. The origins of colonialism and “underdevelopment” in the rise of European capitalism. The struggles of the colonial and postcolonial peoples for political independence, cultural autonomy, and economic development.

203. Economies and Societies in Latin America and the Caribbean since 1492.

The main thrust of the course is an attempt to provide a historical explanation for the general problem of material poverty and the attendant sociopolitical crises that characterize contemporary Latin America and the Caribbean. The course begins with an examination of the organization of the economies and societies in the region on the eve of the European conquest, and the factors determining the level of development attained by this time. This is followed by a discussion of the socioeconomic processes during the colonial period. The post-colonial period (which differs from one country to another) is examined in the context of the inherited socioeconomic structures of the colonial period and the changing conditions in the evolving modern global system.


This seminar course is intended as an introduction to legal studying, reasoning and writing with the field of American Indian law being the focus. We will look at the impact of American law upon Indian tribes and individuals, and touch upon how Native American legal concepts intersect white man’s law.

205W. Europe since 1945.

What is Europe? Is it a definition of a geographical area, an economic entity, or is it a cultural formation? This course will examine both the historical development of European integration and more contemporary debates about the formation of the European Union. With an overview of both world wars and their impacts on European civilization and state system, the course will focus on the stages of European integration from the post-World War II period until now. With an introduction to the composition and role of the institutions in the EU system, its interaction with the national politics will be explored. Contemporary debates on the idea and exercise of the cultural integration of Europe will be paid special attention with comments on the European Union’s expansion and future.

206W. The Holocaust.

(1) The Event: Jews in Nazi Germany, the concentration camp; the Nazi ghetto; the death camps; uprising and resistance. (2) Antecedents: The historical development of Anti-Semitism and the nature of totalitarianism; German political and cultural history of the 19th–20th centuries; the place of the Jewish minority in Europe. (3) Meaning: Survival in theology, literature, and politics; theological and historical interpretations of the Holocaust; the problem of evil.
207. Intellectual History of Science.
A study of intellectual continuity and change in science focused on “revolutionary” episodes from the sixteenth to the twentieth century. After a close look at Thomas S. Kuhn’s still-relevant *The Structure of Scientific Revolutions*, the course will direct attention to several often-acknowledged revolutions: Copernicus’s in sixteenth century astronomy; Newton’s in seventeenth and eighteenth century physics; Darwin’s in nineteenth century biology; quantum mechanics and Einsteiinean relativity in the early twentieth century; and Freud’s revolutionary discovery of the unconscious. Only an intelligent layman’s knowledge of science is required.

208W. Health, Medicine, and Social Reform.
Examination of the interconnected histories of medical science, public health, and political action promoting social and health reform, from the Scientific Revolution of the seventeenth century to the present. Attention will also be directed to improvements in health status, variations in the distribution of disease and risk, and changes in the social role of medicine and medical institutions. The material includes major primary sources: Frank, Engels, Virchow, Riis, Hamilton, Sigerist, Geiger. Secondary readings will include Rosen’s *A History of Public Health* and Jones’ *Bad Blood*.

The long-term intellectual history of essential ideas in the Western medical tradition: illness, health, and mind/body interaction. The time span ranges from Greek antiquity to the present day, with emphasis on the last 250 years and on the relationship between emotional and biological factors in the onset and experience of disease. Primary sources include Hippocrates, Galen, Maimonides, Descartes, Gauß, Charcot, Freud, Alexander, Cannon, Engels. Secondary sources include Porter’s *The Greatest Benefit to Mankind: A Medical History of Humanity*.

211. History from Myth: King Arthur and Robin Hood.
King Arthur and Robin Hood, though so popular a feature of our culture that we almost take them as ‘givens’, in fact we pay serious study about them. Medieval stories can inform us about kingship, ideas of chivalry, socioeconomic functioning of early legal systems. This course looks at such early stories within the contact of their historical periods.

215. The Enlightenment.
The Enlightenment - the structure of ideas typical of eighteenth century Europe and the Americas, shaped and was shaped by increasing globalization and the clash of cultures between whites and indigenous peoples. Explosive questioning of religion, political justice and gender were also the consequence of these global encounters. The course is taught through establishing close relationships to primary text.

216. Barbarian Europe.
Explores the cultures of northern Europe from the 5th c. BCE to the 10th c. CE.

222W. Children, Families, and the State.
This course treats the lives of children and their families in the 18th century against the background of important issues of the day, such as the growth of consumerism and the German cultural revival, as well as making contact with great Enlightenment thinkers who wrote extensively on education, such as John Locke and Jean-Jacques Rousseau. Topics studied include other Enlightenment educationists, toys and games, children’s books and the training of affect, the importance of fairy tales, including their influence on psychoanalysis and its forerunners, child labour, and the lives of poor children.

223. Modern France.
Alternately friends and rivals, modern France and the United States have had a complicated relationship ever since both nations were born in Revolution at the end of the eighteenth century. This course will seek to understand France on its own terms by considering a series of formative events such as the Revolution of 1848, the Franco-Prussian War and the Paris Commune, the Dreyfus Affair and the birth of the intellectual, the very different experiences of World Wars I and II, the post-colonial conflicts in Algeria and Vietman, the near-revolution of May 1968, and contemporary arguments over French foreign and domestic policy.

226W. Hitler’s Germany, 1914–1945.
This course covers the political, social, and cultural history of Germany from 1914–1945, with a postscript on Germany since the end of the Second World War. Central to the course is the effort to understand the rise, triumph, and fall of Hitler and the National Socialist party, regime, and ideology. We will pay particular attention to the differing experiences of various segments of the German population under democracy and then Nazism, including workers, women, and ethnic minorities, especially German Jews. Readings, lectures, and papers are designed to acquaint the student with the course subject matter and give practice in historical interpretation and reasoned argument.

231. British History to 1485.
This course is being expanded from its former concentration on England to include the relationship between England and the Celtic regions—Wales, Ireland, and Scotland. The first three-quarters of the course provide an understanding of the growth of High Medieval civilization in England by means of several topically-focused units. An essay on the themes will be written. The final part allows students to choose a research topic based especially on (printed) primary sources, dealing either with England or with a Celtic region. Plentiful assistance in this work will be provided. Readings will include the survey of Hollister/Stacey, *Beowulf*, a Life of William Marshal, etc.

This course considers the development of European philosophical, political, religious, and aesthetic thought from the late 18th century to the late 19th century. We will end on the eve of the period known as “fin-de-siècle,” which denotes in intellectual history a turn away from the mainstream of rationalist thought. Readings consist entirely of primary texts and include works or excerpts of works by Kant, Wollstonecraft, Schiller, Goethe, Chateaubriand, de Stael, de Maistre, Schleiermacher, Hegel, Comte, Saint-Simon, Fourier, Bentham, Mill, Marx, Schopenhauer, Darwin, the early Nietzsche.

234. Twentieth-Century European Thought.

This course is an introduction to the main currents of European thought in the twentieth century—a century historian Eric Hobsbawm has rightly termed the “Age of Extremes.” Focusing on shifting and competing conceptions of selfhood and society, it will place modern European culture and the intellectuals who forged it within the context of the ordeals of two world wars; a host of revolutions (scientific, sexual, Bolshevik, fascist, and “velvet”); the Holocaust and Cold War; the collapse of European colonialism; and the expansion of American empire. We will center on French and German thought, but other regions of the modern European mind—British, Italian, Polish, Czech, émigré American—will also weigh in.

238. History of British India.

This course surveys the history of the Indian sub-continent from the coming of the British in the seventeenth century to its partition and independence in 1947. Course readings will emphasize the colonial experience and the results of colonial contact, especially as seen through changes in discourses, social structures, cultural norms, and collective identities. Readings will include essays, novels, and histories by both British and Indian writers. Class format will be a mix of lectures, discussions, and films.

243W. Dangerous Texts: Literature and Politics in Russia.

The course examines “dangerous texts” from the 17th c. to the present to see how texts and authors were seen as threats to the state and explores ways in which writers perceived themselves as a “second government” and how this affected their writing. Readings include Avvakum, Radishchev, Pushkin, Turgenev, Dostoevsky, Mandelstam, Solzhenitsyn, Voinovich, and Sinyavsky/Tertz.

249. The Civil War.

The course suggests that there existed two distinct views as to how the new nation would be structured. Once these views clashed and became sectional, the nation was thrown into a political, theological, and, ultimately, a military contest the demands of which led to the incorporation of structural changes that had the effect of resolving the very issues that had propelled the nation into war. As we identify and discuss the causes, conduct, and consequences of the Civil War, we will examine the changing ideas about nation, government, work, race, and gender, and ask: How different were Northern and Southern institutions and, to what extent were northern and southern Americans fundamentally different people?


This course explores the values, assumptions, anxieties, and beliefs of Americans since the late nineteenth century. We will consider both “high” and “popular” cultural artifacts, ranging from literature to the movies, and explore such themes as: the tension between individualism and the quest for community; shifting attitudes toward technology; the impact of gender, race, and class on cultural expression; the search for viable American artistic traditions; and competing visions of social change.


Blue States! Red States! Why so many “Red States” in the South? Why such close attachment to family, religion, and community? Why such a penchant for a distinct music, food, and sports culture? Why has the region been for so long associated with social backwardness—violence, racism, and political conservatism? These and other characteristics (real or imagined) have roots that extend back to Europe and Africa while many are the result of more recent events dating back only a few generations. This course will address these and other questions in the search of historical answers to the roots of southern peculiarities and the origins of those “Red States.”

255. Economic and Social Conditions of African Americans in the Twentieth Century.

Economic development of African Americans during the twentieth century.

258. History of Race in America.

We will identify and discuss the salient moments in the nation’s history when race functioned as an organizing principle in the construction of American public and private institutions. Course readings will examine the historical background of current debates on issues such as Affirmative Action, Diversity, Multiculturalism, Educational Testing, Reparations, the Media, and Political Party Re-alignment.

260. Progressive America.

This course will examine the social, political, and cultural aspects of American Progressivism during the years 1890-1920. Among the topics of focus will be the movement’s origins, its dominant strains of thought, its triumphs, and ultimate failure. In addition to providing a factual background of the movement and period, this course will assist students in developing and sharpening their reading, writing, and analytical skills.

263. The Arts in American Culture.

What did it mean to be American? What did America look like, geographically and in terms of its people? What part did art and photography play in documenting and giving an identity to Americans in the century between 1850 and 1950? Attention
will be given to documenting and representing the West, immigration, and the emerging urban environment. Students will work with the collections of George Eastman House and the Memorial Art Gallery. Requirements for the course include a short museum paper, a term paper, with draft, and take-home midterm and final exams.

This course is a survey of leading American ideas about God, nature, the self, society, and politics from the beginning of the seventeenth century through the mid-nineteenth century. Topics include Puritanism, the American enlightenment, the ideology of the American Revolution, the ascendency of evangelical Protestantism, American romanticism, pro- and anti-slavery thought, and the cultural crisis of the Civil War. Readings from Jonathan Edwards, Benjamin Franklin, Thomas Jefferson, James Madison, Frederick Douglass, Abraham Lincoln, and others.

This course is a survey of leading American ideas about God, nature, the self, society, and politics from the mid-nineteenth century to the end of the twentieth century. Topics include the challenge of secular modernism (and “post-modernism”) to mid-nineteenth century Christian and Enlightenment certainties; the rise and fall of social-democratic liberalism and the criticism of its radical and conservative adversaries; the course of debates over cultural pluralism and feminism; and the resilience of anti-modern strains in American social thought. Primary source readings from figures such as Jane Addams, Daniel Bell, Edward Bellamy, Randolph Bourne, Judith Butler, John Dewey, W.E.B. DuBois, Milton Friedman, Charlotte Perkins Gilman, William James, Martin Luther King, Jr., Thomas Kuhn, Christopher Lasch, Walter Lippmann, Malcolm X, Reinhold Niebuhr, Charles Sanders Peirce, John Rawls, Richard Rorty, William Graham Sumner, Thorstein Veblen, and Michael Walzer.

269. Archaeology of Early America.
This course introduces students to historical archaeology and uses archaeological sites, material culture, and architecture to investigate European colonization of the Americas. Topics include Euro-Indian contact, the transfer of European and African cultures to American shores, creolization and the emergence of distinctly American traditions, Atlantic connections, and how non-documentary sources help us understand the lives of African-Americans, Indians, and white settlers.

272. Africa’s Sleeping Giant: Nigeria since the Islamic Revolution of 1804.
In the context of the global economy, Nigeria, the most populous country in Africa, is blessed with vast mineral resources and agricultural lands able to produce a wide variety of tropical products and foods. The country’s large population is made up of talented and highly resourceful individuals, who are quick to respond to economic incentives. Thus, it is hard to understand why the country has one of the lowest per capita incomes in the world and why the country’s economy occupies such a lowly position within the global economy. We focus on the historical development of socioeconomic/political structures over time to explain why the giant of Africa continues to slumber. Some of the country’s central problems, such as ethnic and religious contradictions, are similar in some way to those in the U.S. The solutions attempted by the governments of both countries, such as affirmative action, are also somewhat similar. We will conduct a comparative analysis of contemporary historical issues in the two countries.

A close look at the recent Japanese literary and cultural scene, with novels by Murakami Haruki (The Elephant Vanishes) and Yoshimoto Banana (Kitchen); films by Itami Juzo (Tampopo) and Morita Yoshimitsu (The Family Game); manga from Tezuka Osamu (Phoenix) and Ikeda Ryo (The Rose of Versailles) to the present and anime from Otomo Katsuhiro (Akira) on; and recent views of Japanese culture from at home and abroad. Other areas of interest include women’s and gay literature, “business novels,” and an examination of the role of the media in today’s consumer culture. Graduate students are expected to do additional reading, give a class presentation, and complete a longer seminar-type paper. Class taught in English with additional instruction in Japanese as required for majors.

279W. Japan at War and After.
The class will cover the period from 1937 to the 1960s. The focus will be Japan’s participation in the Pacific War, the social and cultural impacts of the war, and the Ienaga Saburo, The Pacific War; John Dower, War Without Mercy and Embracing Defeat; Samuel Yamashita, Leaves from an Autumn of Emergencies; Ishikawa Tatsuz, Soldiers Alive; Dazai Osamu, The Setting Sun; Richard Minear, Victors Justice; and other selections. Feature films on the war and the postwar period will also be extensively used in the course and will include: Mishima Yukio, dir. Rite of Love and Death; Kobayashi Masaki, dir. The Human Condition, Part II; Ichikawa Kon, Fires on the Plains and Harp of Burma; Kurosawa Akira, Stray Dog, Ikiru; and Drenken Angel; Shohei Imamura, Black Rain, and Ozu Yasujiro, Tokyo Story; and others, depending on availability.

The class will study the history and cultural experiences of Asian immigrants and Asian-Americans in the United States and Hawaii in the 19th and 20th centuries.

282W. The Samurai.
“The Samurai” will examine the emergence of the warrior class in the 10th and 11th centuries, its evolution from rustic warriors to medieval military power holders, and military bureaucratic administrators. The class will include readings on the history, literature, philosophy, and religion of the samurai class. Films treating the popular imagery of the samurai will be projected in class. Various representations of the samurai will be compared and contrasted.
287. History of International and Global Health.
Examines the initiation, evolution, and transformation of international and global health activities/policies focusing on developments in the 19th-early 21st centuries. It also considers events such as pandemic plague, exchange of diseases between the Old World and the New, and the role of health concerns in early European and American colonialism and imperialism. The major focus is the evolution of cooperative efforts in international health under governmental, non-governmental, and trans-governmental auspices with attention given to the role of international conferences/conventions, the work of the International Red Cross and the Rockefeller Foundations International Health Division, and the creation/functioning of the Pan American Health Organization, the Office International d’Hygiène Publique, the League of Nations Health Organization, and the World Health Organization. For the later 20th century, we will focus on the World Bank, the Gates Foundation, UNAIDS, and other current players in global health.

289. History of European Exploration.
Exploration is examined as an integral part of European expansion into the rest of the world and of the opening of the U.S. in the eighteenth and nineteenth centuries. Three themes organise the course: Pacific exploration by James Cook; the opening of the American West by Fremont, Louis and Clark, and others; and the exploration of the Arctic by men working for Hudson Bay Company.

292W. Totalitarianism and Everyday Life.
In this course we will compare everyday life in the Soviet Union under Stalin, Nazi Germany, and Fascist Italy. Topics we will discuss include the extent and location of popular support for these regimes, ordinary people’s survival strategies, mass consumption, state efforts to manipulate family life and their success or failure, and gender roles. We will also analyze the concept of “totalitarianism” and discuss its value (or lack thereof) as a heuristic device.

296W. Women in East Asia.
In seminar format, students will read and discuss books and articles on women’s history in Japan, China and Korea. Differences in their responses to the modern world and their role in the history of modern East Asian society will be emphasized. The study of women in modern East Asian history will be used as a vehicle to improve student’s critical reading, speaking, and writing skills.

ADVANCED SEMINARS

305W. American Health Policy and Politics.
This course examines the formation and evolution of American health policy from a political and historical perspective. Concentrating primarily on developments from 1932 to the mid-1990s, readings and seminar discussions focus on political forces and institutions and on historical and cultural contexts. Among the topics covered are periodic campaigns for national health insurance, efforts to rationalize and regionalize health care institutions, the creation of Medicare and Medicaid and the further evolution of these programs, the rise of dominance of economists and economic analysis in the shaping of health policy, incremental and state-based vs. universal and federal initiatives, and the formation and failure of the Clinton administration’s health reform agenda.

308W. Modernity and Modernism.
A study of selected topics in the history of modern thought and culture in Europe and the United States.

314W. International Human Rights.
What does it mean to be human? What political, economic, religious, social, or sexual rights might be part of different people’s working definitions? This course will look at both (a) the historical development of conflicting theories of human rights and (b) more contemporary debates about their ideal extent, their exercise, and their enforcement. Special topics will include debates over the meaning of the American and French Revolutions, the fight to design an International Declaration of Human Rights in the aftermath of World War II, the history of organizations such as Amnesty International, and the controversy around UN events such as the 1995 World Conference on Women in Beijing, the 2002 World Summit on Sustainable Development in Rio de Janeiro, and the 2000 and 2005 Millennium Summits in New York City.

331W. The Soviet Union and the Cold War.
This seminar, based around discussion of readings and a major research paper, will be focused on the Soviet side of the Cold War, including the conflict’s impact on Soviet culture, society, daily life, and the economy.

333W. U.S. Colloquium I.
Surveys the historiography of colonial and antebellum America. Senior history majors may register by invitation only.

334W. U.S. Colloquium II.
Explores the major interpretations of American history from Reconstruction to the late 20th c. resurgence of conservatism. Senior history majors may register by invitation only.

342. Emergence of the Modern Congress.
Through intensive reading and discussion, we will analyze major issues in congressional history and legislative institutions. We will examine the basic institutions of the House and Senate—committees, parties, leaders, and rules. The course is designed to introduce students to the principal approaches used by political scientists to study Congress, with special emphasis on the development of congressional institutions over time. This is an advanced seminar, appropriate for juniors and seniors with substantial background in political science, economics, and/or history.
344W. *When New York was the Wild West.*

This course explores New York’s history from Seneca settlement to Seneca Falls, using recent scholarship to consider Iroquois, Dutch, English, and American periods of history. Specific topics include New York City and its hinterland, the shift from Dutch to English rule, Slavery in New York City, British-occupied New York and the American Revolution in New York State, 18th and 19th century religious movements, the dynamics of frontier settlement, and the Erie Canal. Students will devise and write an original primary research paper on a particular aspect or period of New York history.

345W. *Just Wars.*

The seminar considers the concept of just war and the application of just war theory to specific historical cases. Together we will discuss several models Arendt, Augustine, Clauswitz, and Waltzer at the beginning of the semester, and at least one scholar’s application of theory to a specific case. Students will identify the specific war on which they intend to focus their research, primary and secondary sources they will consult, and the questions they will ask. At different stages we will meet to discuss shared readings, one-page research proposals, bibliographies, thesis statements, first paragraphs, and first drafts of research papers.


By the middle of the 19th c. a highly integrated economic system, called the Atlantic Economic Order, had emerged, linking together through a web of multilateral trade the economies of the Atlantic basin that remained unconnected in the late 15th c. The economies of Africa occupied the lowest position within this Economic Order. We examine the extent to which the Transatlantic Slave Trade could help explain this weak position. Beginning with a general view of the level of socioeconomic development in Africa by the late 15th c., relative to other regions in the Atlantic basin, we will proceed to examine the impact of the Atlantic slave trade on the competitive development of commodity production in Africa for the evolving Atlantic market of the period, as well as the socioeconomic and political consequences of the export slave trade within Africa. One major theme of the course is the extent to which the Trans-Atlantic Slave Trade limited the development of capitalism in Africa during the period in question.

357W. *Evolution of the Current World Economic Order from 1500.*

The course traces the historical origins of the integration and hierarchical structure of the current global economy. It examines specifically the historical forces which produced the unequal international division of labor between industrial and non-industrial nations, starting with the British Industrial Revolution which occurred within the Atlantic world economy. The rise and fall of the USSR and the command economies of Eastern Europe are examined in the context of efforts by underdeveloped countries to improve their performance and location within the global economy. The more recent successes of some Asian countries and the continuing external debt problems of Latin American and African countries are also examined with the conceptual framework of international political economy to predict the probable future of all poor peoples both in the poor and in the rich countries.

373W. *Sex and Gender in the American City.*

This course will explore the role of gender and sexuality in American cities from the nineteenth century to the present. Through intensive reading and a research paper we will explore how gender and sexuality shaped the urban environment in the arenas of labor, politics, everyday life, and the built environment. We will also examine how the structures and cultures of American cities prescribed normative gender and sex roles on urban residents.

378W. *Topics in Revolutionary America.*

This course explores the roots of the American Revolution and uses recent scholarship to consider how the war affected a wide array of Americans. We will also situate the American Revolution in its Atlantic and global contexts as we examine the course of the war and its enduring legacies.

382W. *Topics in Twentieth-Century American Cultural History.*

This course concentrates on the cultural and intellectual ferment of the first twenty years of the twentieth century spurred by the growing acceptance of the idea that no single principle could account fully for diverse phenomena. In many fields of inquiry, the notion that there were many truths, many values, and many beauties challenged the way of the world. As a result, American cultural and intellectual life featured a sense that the world was not already made, that standards were not firm and fixed, that accepted hierarchies were not always valid, and that contingency and context mattered. Among the fields of inquiry we will address are popular culture, philosophy, political science, psychology, and anthropology.
Interdepartmental Degree Programs

Center Staff
Richard Feldman, PhD (Massachusetts)
  Professor of Philosophy; Dean of the College
Jacqueline L. Levine, MA (Rochester)
  Assistant Dean and Director of Study Abroad
Heidi Kozireski
  Counselor
Theodore Pagano
  Counselor
William Six
  Administrative Assistant

Committee on Individualized Interdepartmental Programs

Thomas DiPiero, PhD (Cornell)
  Professor of French and of Visual and Cultural Studies
Udo Fehn, PhD (Technical University of Munich)
  Professor of Geology; Chair of the Committee
Suzanne J. O’Brien, BA (Rochester)
  Associate Dean of Undergraduate Studies and Director of the College Center for Academic Support

Students whose educational interests do not fall within one of the existing departmental majors have opportunities for special degree programs through the Center for Study Abroad and Interdepartmental Programs. In addition, the center administers study abroad programs.

Interdisciplinary Studies

The Center for Study Abroad and Interdepartmental Programs enables students to pursue educational goals that lie outside traditional disciplines and departments. Through its faculty Committee on Individualized Interdepartmental Programs, it supervises specially constructed programs leading to the BA degree. These include programs tailored to the specific needs of the individual student. In recent years, these individualized majors have included such diverse areas as Italian studies, law and society, and cultural studies.

The major—interdepartmental studies leading to bachelor’s degrees awarded by the College.

The minor—an interdepartmental minor may also be arranged through the center.

An interdepartmental MA or MS 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 Lattimore Hall.

Students seeking an individualized interdepartmental program should begin planning no later than the second semester of the sophomore year. After discussion with two faculty members who agree to serve as advisors and meeting with an advisor in the Center for Study Abroad and Interdepartmental Programs, students prepare a proposal, which contains the following information: (1) a statement indicating the reasons for the particular major and how it relates to their educational and career goals, (2) a statement explaining why these goals cannot be met within an existing departmental major, (3) a listing of those courses that will make up the major (at least 10 in number or 40 credit hours), 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 major in American studies that 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.

The proposal for the interdepartmental minor requires the support of one faculty member to act as advisor. Students apply by submitting an essay, as for the major, along with a list of six courses or 24 credit hours.

Once the students’ proposals are complete, they are handed in to the center and subsequently are submitted for action to the Committee on Individualized Interdepartmental Programs. In judging the proposals, the Committee considers the students’ academic goals and attempts to judge the coherence and thoughtfulness of the proposed programs.

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 Lattimore Hall.

The bachelor’s degree with distinction is awarded to students with a sufficiently high major 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.

Interdepartmental clusters may be proposed by students. A form for this purpose is available at the center. Interdepartmental cluster proposals include courses from three different departments.

NOTE: Proposals must be submitted by April 1 or November 1. Proposals will not be accepted after November 1 of the senior year.
Judaic Studies

Edward Wierenga, PhD (Massachusetts)
Professor of Religion and of Philosophy; Chair of the Department

The Center for Jewish Studies of the University of Rochester promotes research, scholarship, and education in Judaism and Judaica. Through publication, lectures, fellowships, and intellectual collaboration, the center aims to increase knowledge in the field of Jewish studies, to provide enriched learning opportunities for students, to contribute to the intellectual life of the University, and to share its resources with the Rochester community. Jewish studies courses are offered in modern Hebrew, religion, and history, as well as other areas. For further information about offerings in Jewish studies, see the Department of Religion and Classics.

For additional information, contact the Department of Religion and Classics.

Minor in Judaic Studies
- JST 106. Introduction to Hebrew Bible (cross-listed with REL 101)
- JST 113. History of Judaism (cross-listed with REL 103)
- Four additional JST courses, including up to two courses in Hebrew language

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

101. Elementary Hebrew I.
Introduction to the structure of Modern Hebrew. Practice in vocabulary, use, grammar, reading, and writing.

102. Elementary Hebrew II.
Direct continuation of Hebrew 101 with emphasis on enhancing reading, writing, and speaking skills.

103. Intermediate Hebrew.
Continuation of HEB 102 with emphasis on enhancing reading comprehension and writing and speaking skills. Students are expected to have good understanding of the structure of Hebrew including familiarity with verb forms.

106. Introduction to the Old Testament.
Examination of the Old Testament/Hebrew Bible in Ancient Israel in its religious, historical, and literary contexts.

113. History of Judaism.
An introduction to the religious and cultural development of Judaism. Will emphasize Judaism as a living tradition, one which has been subject to both continuity and change among its practitioners throughout its history.

A thematic introduction to the relationship between Jews and American entertainment media from the turn of the 20th century to today. Will address Jewish experience in radio, Hollywood, theatre, and television, as well as popular print culture such as comic books.

204. Hebrew through Conversation.
This is a fourth semester course in the Hebrew language series designed to enhance and advance conversational skills using various sources including Israeli newspapers, Hebrew stories, and topical discussions based on students’ interests and Israeli life.

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.

214. Imagining the Jew.
Popular representations of Jews and their influence on Jewish acculturation, Americanization, and continuity.

The music of Judaism and the Jewish people from the earliest times until the present and the role of music in shaping the character of Jewish historical, religious, and cultural experience.

219. The Holocaust in Film and Literature.
How does one represent the unrepresentable? This is the key question we will explore as we look at films and literature about the Holocaust. As we look at fictional films, novels, documentaries and memoirs, we will discuss topics including memory, trauma, truth and representation. This course offers a look at the ways in which artists and their audiences negotiate the themes of loss, horror and redemption within the context of the Holocaust and its aftermath.

220. Jews and Multiculturalism in America.
Jewish immigration in the U.S. and the ways in which these immigrants chose to acculturate (or not).

231. German Jews.

This course examines how culture, ethnicity, and politics intersect in 20th-century Russian literature. We begin with excerpts from Dostoevsky’s “Diary of a Writer,” sacralizing Russianness and demonizing Jews. Political and artistic avant-gardes 1900-1930 are analyzed for their attempts to overcome traditional ethnic divisions. In Stalin’s Russia an international Soviet identity was replaced by a Russian state culture, which put “cosmopolitanism” on trial after World War II. A secular Russian cultural identity was the norm until the state withdrew from the cultural sphere in the late 1980s, but Russian Jewish emigre literature
was available to many readers through unofficial channels. We end with the battle of competing identities in post-1985 Russia. Readings include: Dostoevsky, Babel, Grossman, Mandelstam, Pasternak, Roziner, Tertz, Markish, Rasputin, and Brodsky. In English.

248W. Politics of Identity.
This course examines how culture, ethnicity, and politics intersect in 20th-century Russian literature. We begin with excerpts from Dostoevsky’s “Diary of a Writer,” sacralizing Russianness and demonizing Jews. Political and artistic avant-gardes 1900-1930 are analyzed for their attempts to overcome traditional ethnic divisions. In Stalin’s Russia an international Soviet identity was replaced by a Russian state culture, which put “cosmopolitanism” on trial after World War II. A secular Russian cultural identity was the norm until the state withdrew from the cultural sphere in the late 1980s, but Russian Jewish emigre literature was available to many readers through unofficial channels. We end with the battle of competing identities in post-1985 Russia. Readings include: Dostoevsky, Babel, Grossman, Mandelstam, Pasternak, Roziner, Tertz, Markish, Rasputin, and Brodsky. In English.

249. Secret Nation.
The cult and culture of secrecy in Russia from Ivan the Terrible to the present. Russia was always an enigma, as tsarist and Soviet governments gathered and controlled information. The Russian people kept information from the government, and foreign states sent out disinformation of their own about Russia. There was an active underground in religion, literature, politics, the economy, and other areas. With glasnost, Gorbachev began the process of uncovering secrets from above, and a freer press began to do the same from below. We use materials from history, religion, literature, film, political science, and economics, to get a richly detailed picture of the information that was hidden, and the means by which this was accomplished. Official secrecy that was originally a defensive move came to undermine the state it sought to protect. At the end of the semester we see to what extent old habits of secrecy persists in Russia today. The course is taught in English.

265W. Modern Jewish History.
This seminar, intended for juniors and seniors with some background in either American or European history, examines significant topics in modern Jewish history, including Emancipation, the Damascus Affair in the Ottoman Empire, the Haskalah, Bundist and Zionist movements, emigration to North America and Palestine, the rise of modern anti-Semitism, the emergence of Reform, Conservative and Reconstructionist Judaism, World War I and the Balfour Declaration, the American Jewish community in the twentieth century, World War II and the Holocaust, the founding of the state of Israel and the Arab-Israeli conflict.

390. Supervised Teaching.
391. Independent Study.
394. Internship.
Linguistics

Professor

James F. Allen, PhD (Toronto)
John H. Hessauer Professor of Computer Science, Professor of Linguistics, and of Brain and Cognitive Sciences

Gregory N. Carlson, PhD (Massachusetts)
Professor of Linguistics, of Philosophy, and of Brain and Cognitive Sciences

Michael K. Tanenhaus, PhD (Columbia)
Beverly Petterson Bishop and Charles W. Bishop of Brain and Cognitive Sciences, Professor of Psychology, and of Linguistics

Associate Professor

Joyce McDonough, PhD (Massachusetts)
Associate Professor of Linguistics and of Brain and Cognitive Sciences

Jeffrey T. Runner, PhD (Massachusetts, Amherst)
Associate Professor of Linguistics and of Brain and Cognitive Sciences

Ted R. Supalla, PhD (California, San Diego)
Associate Professor of Brain and Cognitive Sciences and of Linguistics

Assistant Professor

Christine A. Gunlogson, PhD (California, Santa Cruz)
Assistant Professor of Linguistics and of Brain and Cognitive Sciences

Professor Emeritus

Demetrius Moutsos, PhD (Chicago)
Professor Emeritus of Linguistics

Visiting faculty and teaching assistants may be assigned to aid in instruction.

The field of linguistics explores the nature of human language and languages, seeking to describe what human languages are like, how languages develop and change, how it affects a society, and how people learn and use language. Since language is central to so many arenas of human endeavor, the study of linguistics makes substantial contact with a number of disciplines in the humanities, the social sciences, and the natural sciences, including cognitive science, psychology, sociology, education, anthropology, language studies, classics, computer science, philosophy, and the law. As a result of its diversity, linguistics offers exciting fields of study for students with varied inclinations and backgrounds so long as they have a deep intellectual curiosity about language. The study of linguistics offers many unexplored areas and issues that invite adventurous minds.

The linguistics major is designed to provide students with opportunities for a strong liberal arts education, as well as for preprofessional training in several applied areas. The program consists of a core of five courses, which provide a solid understanding of the study of natural language. From the core, students may then follow a number of different tracks depending on their interests.

Up-to-date information on clusters and specialized tracks is available through the department's web page at www.ling.rochester.edu.

BA in Linguistics

The linguistics major requires a total of 11 courses, with a minimum of courses parented by the Department of Linguistics. All majors must take the basic five core courses, and a senior seminar. Students must also take five additional electives, at least three of which must be at the 200 level or above. Four of these electives must fit into either a preapproved track or an individualized track approved by the undergraduate advisor.

- Five core courses: LIN 101, 110, 210, 220, 225
- Five electives (at least three at the 200 level):
  - 100-level courses: LIN 102, 103, 104, 105, 162.
- 300-level course: LIN 389 (Senior Seminar)

Minor in Linguistics

Students may minor in linguistics by taking LIN 110, 210, 220, 225; plus one elective.

Upper-Level Writing Requirement

Two of the five core courses in linguistics are designated as upper-level writing courses. All majors take these core courses, automatically satisfying the department's upper-level writing requirement.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

101. People and Their Language.

This introductory level course is designed for students who have no background in linguistics, with some new topics for students who do. The course addresses the basic question “What is Language?” from a broad variety of perspectives including linguistics, sociolinguistics, historical linguistics, sign language linguistics and gesture study. We will consider questions such as: What elements are found in all human languages? Are they systematically organized or random? Are some languages/dialects better than others? What is the relationship between written and spoken language? How does manual gesture relate to spoken language, and to sign language? How do languages develop? Die? How are they related? In exploring these questions we will confront a variety of common misperceptions about language. Each lecture has reading assignments drawn from the textbook and published articles. Class discussion will be encouraged as much as possible.
102. **Language and Social Identity.**

This course examines the relationships between language and social diversity. Its aim is to shed light on how individuals and social groups distinguish themselves on the basis of their choice of language and their sharing (or lack of it) of a common norm of social evaluation and interpretation. In particular, it will investigate the relationship between language and such social variables as age, gender, status, ethnicity, and place of origin. Finally, it will consider the role of language differences in the creation of social stereotypes and their implications for social advantage or disadvantage. Topics covered include multiculturalism vs. assimilation, bilingualism, language and education, language maintenance and language shift, and the role of various ethnicities in the American linguistic scene.

103. **Language and Sexuality.**

This course will investigate various aspects of language as used by members of sexual minority groups, focusing on language of and about gay men, lesbians, bisexuals and transgendered people, including “reclaimed epithets” (e.g., ‘dyke’ and ‘queer’), gender vs. sexuality vs. sex, and the role of language in creating/maintaining sexual categories and identities.

105. **Language in Advertising.**

The course examines the use advertisers make of language in selling their products and how it affects our perceptions of the product and ourselves. The emphasis in the course is on learning about the structure of language and how we can use it as a guide to observing and understanding the effectiveness of commercial messages.

106. **Linguistics and the Law.**

This course offers a critical examination of how linguistic analysis figures in legal issues and practices, a growing field known as forensic linguistics. Topics include speaker identification, the use of questions in eliciting testimony, translation and interpretation in the courtroom, and legal language. Emphasis is on understanding and assessing linguistic argumentation and how it is applied (and sometimes misrepresented and misapplied) in the domain of law.

110. **Introduction to Linguistic Analysis.**

This course introduces students to the study of the structure of human language. We will cover the six core areas of linguistic investigation: Phonetics (articulation, acoustics, and perception of speech sounds), Phonology (sound patterns), Morphology (internal structure of words and their organization in the mental lexicon), Syntax (internal structure of phrases and sentences), Semantics (word and sentence meaning), and Pragmatics (language use in context). The course focuses on developing skills in the areas of linguistic data analysis and interpretation of linguistic data in ways that aim to address theoretical and empirical issues in the study of language.

205. **Historical Linguistics.**

This course is designed to give an introduction to the principles of historical linguistics, and their practical application. Topics covered include genetic relations, sound change, borrowing, the comparative method and language classification, types of language contact, morphological, syntactic and semantic change, and a real linguistics.

**SENIOR SEMINAR**

206. **History of English Language.**

The development of the English language from the Anglo Saxon period on up, focusing on texts from representative periods.

208. **Language Development.**

Introduces children's language development, including the acquisition of phonology, syntax, and semantics. 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.

210. **Introduction to Language Sound Systems.**

This course introduces students to the principles underlying sound systems in human language. Attention will be given to articulatory phonetics, with some discussion of acoustic phonetics; practice in the production, recognition, and transcription of sounds in various languages of the world, and to the fundamentals of phonological analysis and argumentation through hands-on investigation of language sound systems.

217. **Language and Psycholinguistics.**

Overviews the nature and processing of human languages, including comparisons between language and animal communication systems, the biological bases of human language, and the cognitive mechanisms used in producing, understanding, and learning language.

218. **Language and the Brain.**

Examines how the comprehension and production of language is implemented in the human brain. Uses evidence from neuropsychological and brain imaging studies to consider the following questions: What is the network of brain areas that subserves language processing? What are the specific functions of these areas? What happens when these brain areas are damaged? What is the timing of brain activity in these areas during language processing? Finally, how do the brain areas involved in language processing overlap with those involved in other complex cognitive processes?

220. **Introduction to Grammatical Systems.**

This introductory course examines the grammatical structure of words and sentences from the standpoint of modern linguistic theory. The course develops the basic techniques and concepts of morphological and syntactic analysis placing particular emphasis on the ways in which semantic, morphological and lexical information interacts with the syntax. No syntax background is assumed. This course is intended for majors and non-majors alike.
225. Introduction to Semantic Analysis.
This course introduces students to the basic logical notation and techniques used in formal analysis of natural language meaning, primarily in terms of truth-conditions. We will discuss the basics of first-order logic and set theory, and begin to investigate how meanings represented in these terms correlate with the syntactic and lexical structures of sentences of natural language. Topics include such notions as negation, conjunction and disjunction, plurality, quantification, indexicals, entailment, implicature, and presupposition. Students of graduate standing or those with strong formal backgrounds should consider starting with LIN 265/465 instead, for which this course is ordinarily prerequisite. This course counts towards satisfying the core course requirement for majors.

226. Morphology.
The course examines the structure and definition of the linguistic unit “word” its typology and the relationship of the morphological component to other levels in the grammar. The course includes an introduction to analytical techniques with emphasis placed on an examination of data from a range of languages. The building blocks of words will be analyzed and topics such as affixation, reduplication and inflectional and derivational morphology will be covered. We will examine the properties of words and how they fit into the larger structure of linguistic knowledge, including the relationship between words and syntactic structure (ex., phrases and sentences) and the relationship between words and phonological structure (ex., phonological rules and prosodic structure).

227. Topics in Phonetics and Phonology.
The course is a laboratory course intended to provide participants with an overview of research in laboratory phonology. Issues vary from term to term but cover areas in segmental, metrical and international phonology and the phonology/phonetics interface.

Examines signed languages and the cognitive constraints that shape them, through a detailed consideration of the structure of American Sign Language and other natural signed languages of the world. Includes training in sign language notation and analysis. Knowledge of sign language is required.

234. Modern English Grammar.
The course Modern English Grammar is a systematic and rigorous survey of the structure of contemporary, general purpose, international Standard English. We survey principles governing the construction of English words, phrases, clauses and sentences, and examine elements of the English spelling system. Throughout, the course pays attention to areas of grammar that commonly come to the attention of writers and learners, with a focus how an understanding of the systematic nature of the language might yield insight into these and other phenomena.

241. Language Use and Understanding.
Explores the cognitive mechanisms used to speak and understand language, with a special focus on contextually situated language use. Studies the moment-by-moment processes underlying language production and comprehension, including how speakers choose words and phrases and how listeners understand them.

247. Natural Language Processing.
Prerequisites: CSC 172 and 242.
An introduction to natural language processing: constructing computer programs that understand natural language. Topics include parsing, semantic analysis, and knowledge representation.

248. Statistical Speech and Language Processing.
Prerequisites: CSC 172 and 242.
An introduction to statistical natural language processing and automatic speech recognition techniques. This course presents the theory and practice behind the recently developed language processing technologies that enable applications such as speech-driven dictation systems, document search engines (e.g., finding web pages) and automatic machine translation. Students taking this course at the 400 level will be required to complete additional readings and/or assignments.

260. Syntactic Theory.
This course picks up where LIN 220 leaves off, exploring topics in natural language syntax from a cross-linguistic perspective. The goal of the course is an approach to syntax that accounts for both language-particular as well as universal constraints on language. Among the topics studied are phrase structure, constraints on co-reference (binding), thematic roles, long- and short-distance dependencies (extraction and NP movement), constraints on unexpressed phrases (trace and control theory), and quantifier scope (logical form).

This syntactic theory course examines syntactic phenomena from the perspective of phrase structure and lexicalist grammar as opposed to transformational grammar. The course will examine and develop phrase structure grammar (specifically Head-driven Phrase Structure Grammar) approaches to standard syntactic problems, contrasting them where appropriate with transformational approaches. No background in non-transformational approaches will be assumed. This course can be taken as LIN 261 or as LIN 461 and is meant for linguistics majors and non-majors alike.

262. Topics in Experimental Syntax.
This course provides an introduction to experimental methods that can be used to investigate questions that are relevant for syntactic theory. Discussion covers a range of methodologies, including self-paced reading, visual world eye-tracking, magnitude estimation, and questionnaires. During the class, students learn to understand and critically evaluate research that uses various
experimental methods, and learn to design and run their own experiments. Can be used towards the linguistics major, minor, or cluster.

**265. Formal Semantics.**

This course is an in-depth introduction to the formal analysis of natural language meaning, employing techniques that have been developed in language and formal philosophy over the last century. Issues include intensionality, quantification, tense, presupposition, plurality, the analysis of discourse, and other current issues. Familiarity with syntax, logic, and/or computation are helpful but not necessary.

**266. Formal Pragmatics.**

Within theoretical linguistics, pragmatics is (broadly speaking) the study of how language users convey meaning. The concerns of this course fall into three general areas: (1) How meaning carried by linguistic elements (such as sentences) interacts with meaning arising from inferences about speakers intentions; (2) Ways of characterizing meaning, especially with respect to linguistic elements not easily handled in traditional semantic (i.e., truth-conditional) terms; (3) The role of context in determining meaning. Topics to be discussed include the relation between semantics and pragmatics; representations of context; truth-conditional and other types of meaning; presupposition; implicature and Grices Cooperative.

**267. Topics in Syntax and Semantics.**

This course covers topics at the interface of syntax and semantics. No specific syntax or semantics background is required, though the equivalent of LIN 220 is recommended.

**389. Senior Seminar.**

A seminar course for senior linguistic majors in their last semester of coursework. This seminar is a linguistics field methods course. We will work with a native speaker to elicit data and provide a description of the grammar of that speaker’s language based on our data. This course is designed for senior linguistics majors; for interested non-linguistics majors or those who are not in their last semester of linguistics coursework, please contact the instructor.

**391. Independent Study.**

**393. Senior Project.**

**399. Practicum in Linguistics.**

Investigation of special problems in linguistics.

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**Literary Translation Studies**

**Professor:**

Thomas DiPiero, PhD (Cornell)
Professor of French and of Visual and Cultural Studies; Senior Associate Dean of Humanities

Kenneth Gross, PhD (Yale)
Professor of English

Bette London, PhD (California, Berkeley)
Professor of English

John Michael, PhD (Johns Hopkins)
Professor of English and of Visual and Cultural Studies; Literary Translation Studies Advisor

Claudia Schaefer, PhD (Washington University, St. Louis)
Rush Rhees Professor and Professor of Spanish

Joanna Scott, MA (Brown)
Roswell S. Burrows Professor of English

**Associate Professor:**

Beth E. Jörgensen, PhD (Wisconsin, Madison)
Associate Professor of Spanish

The Certificate in Literary Translation Studies is an interdisciplinary program in the humanities that provides undergraduate students with an opportunity to study the theory and practice of literary translation through coursework in international literature, advanced literary studies, translation, language arts, and the craft of writing.

In addition to required and elective courses, students may also choose to participate in domestic and international internships with publishing houses or literary journals.

Students in the CLTS program also have the opportunity to work with the new international literature publishing imprint, Open Letter, which is dedicated to translating and publishing literature from around the world.

**Certificate in Literary Translation**

There are four formal requirements for admission to the CLTS program, the first two to be completed before formal application to the program, and the others to be submitted with application to the program:

- A 200-level foreign-language course or equivalent
- An upper-level literature or culture course in students’ target language
- Writing sample (creative or expository)
- A brief essay describing students’ interest in the program and any prior experience with foreign languages and translations

Application materials are available from the CLTS advisor or in the College Center for Academic Support. Completed applications should be returned to the advisor. In order to be able to complete all certificate requirements in time, students should make every effort to apply to the program no later than the
spring of their junior year, but in any case they must apply by the first week of their penultimate semester at Rochester.

In order to receive the CLTS, students must earn a minimum GPA of 2.0 in program coursework. There are six core components to the CLTS program:

1. LTS 200. Studies in Translation
2. LTS 201. Studies in International Literature
3. Language Arts and the Craft of Writing
   Choose one course from the selections in the following lists:
   - Creative Writing
     ENG 275. Advanced Creative Writing: Fiction
     ENG 276. Advanced Creative Writing: Poetry
     ENG 277. Screen Writing
     ENG 375. Seminar in Fiction Writing
     ENG 376. Seminar in Poetry
     ENG 377. Writing in Other Genres
   - English
     ENG 200. History of the English Language
   - Linguistics
     LIN 210. Introduction to Language and Sound Systems
     LIN 225. Lexical Semantics
     LIN 265. Formal Semantics
   - Modern Languages and Cultures
     CLT 101S/2xx. (language, literature, culture)
     CLT 389. MLC Seminar
4. Advanced Literary Studies
   Choose two courses from the selections in the following lists:
   - English
     ENG 201. Old English Literature
     ENG 202. Middle English Literature
     ENG 203. Medieval Drama
     ENG 204. Chaucer
     ENG 206. Studies in Medieval Literature
     ENG 207. English Renaissance Literature
     ENG 208. Renaissance Drama
     ENG 210. Shakespeare
     ENG 211. Milton
     ENG 213. Studies in Renaissance Literature
     ENG 214. Eighteenth-Century Literature
     ENG 215. Early British Novel
     ENG 218. Early American Literature
     ENG 220. Romantic Literature
     ENG 221. Victorian Literature
     ENG 222. Nineteenth-Century British Novel
     ENG 225. American Romantics
     ENG 226. American Realists
     ENG 227. American Moderns
     ENG 228. African-American Literature
     ENG 230. Asian-American Literature
     ENG 231. Twentieth-Century British Novel
     ENG 232. Modern Literature
     ENG 233. Modern Poetry
     ENG 234. Modern Fiction
     ENG 235. Modern Drama
     ENG 236. Contemporary Fiction
     ENG 237. Contemporary Poetry
     ENG 238. Studies in Modern and Contemporary
     ENG 248. Contemporary Women's Writing
   - Religion and Classics
     REL 240W. Muhammad and the Qur'an
     REL 244W. Islamic Mystical Poetry
     REL 250. Shiva and Shakti
     REL 253. Krishna
     REL 255. Hindu Goddess and Women
     REL 309. The Celestial Song
     REL 310. Seminar in Mahabharata
     REL 313. Ramayana
     REL 314. Hindu Sanskrit Poetics
     CLA 210S. Roman World
     ARA 148. The Arabian Nights
     ARA 203. Genre and Literary Form in Arabic
   - Modern Languages and Cultures
     FR 204. Contemporary French Culture
     FR 205. Francophone Cultures
     FR 220. Eighteenth-Century French Novel
     FR 230. Nineteenth-Century French Novel
     FR 261. Twentieth-Century French Novel
     GER 229. Kleist and Kafka
     GER 230. Poe and Hoffmann
     IT 219-221. Dante
     IT 222. Boccaccio
     IT 245. History of Italian Culture
     JPN 215. Modern Japan
JPN 233. Culture of Zen
JPN 252. Recent Japanese Fiction
JPN 254. Modern Japanese Literature
JPN 273. Women Writers
RUS 231. Great Russian Writers
RUS 235. Tolstoy’s War and Peace
RUS 237. Dostoevsky
RUS 243. Chekhov and the Modern Short Story
RUS 247. Secret Nation
SP 205. Spanish Culture
SP 206. Spanish-American Cultures
SP 215/217. The Quijote/Don Quixote
SP 245. Twentieth-Century Spanish Theater
SP 249A. Stories from Spain (Nineteenth-, Twentieth-, and Twenty-First-Century Novels)
SP 256. Twentieth- and Twenty-First-Century Spanish-American Prose
SP 257. Latin American Theater and Poetry
SP 260. Latin American Women Writers
SP 262B. Cuba XXI
SP 282. U.S. Latinos/Latinas

5. LTS 395. Portfolio
This is the capstone project for the CLTS program. Under the direction of an advisor, students complete a translation of a group of poems, a short story or novella, or an excerpt from a novel or play. The portfolio should represent a semester’s independent work.

6. Elective
This component may be an approved publishing internship or one additional course from the lists of Component III or Component IV.

Internships
CLTS students interested in pursuing a career in translating or publishing are encouraged to participate in one of the following internship programs: editorial internships with Open Letter, the University of Rochester literary imprint; international publishing internships in France, Germany, Italy, Japan, Mexico, and Spain; domestic publishing internships with publishing houses or literary magazines in New York that are involved in international literature.

Mathematical Modeling in Political Science and Economics

Committee
Jonathon Pakianathan, PhD (Princeton)
Associate Professor of Mathematics and Chair of the Program
William Thomson, PhD (Stanford)
Elmer B. Milliman Professor of Economics and Professor of Economics
Mark Fey, PhD (Caltech)
Associate Professor of Political Science

Long a domain of the natural and applied sciences, the use of mathematical techniques has gained growing acceptance in fields like political science, economics, business, and psychology. Departments in the University of Rochester have made numerous contributions to the increasingly mathematical aspects of their fields and are uniquely positioned to teach students who wish to focus on the uses of mathematics in the social sciences. This program draws on classes in economics, mathematics, and political science. Ordinarily, interested students should apply by spring semester of their junior year. This certificate is administered through the Multidisciplinary Studies Center.

Certificate in Mathematical Modeling in Political Science and Economics
Students must fulfill all five of the requirements noted below with a minimum overall grade point average of 2.0. No course used to satisfy these requirements may be taken satisfactory/fail.

- Calculus/linear algebra (3–4 courses): MTH 161–162 (or MTH 141–143) (or MTH 171-172) and MTH 165, Linear Algebra with Differential Equations.
- Modeling Rational Behavior (1 course): MTH 217, Mathematical Modeling in Political Science; PSC/ECO 288, Introduction to Game Theory; or ECO 207, Microeconomics.
- Social Science Applications (3 courses): Three additional courses in political science and economics from the Courses of Instruction listed below, with at least one from each department.
- Additional mathematics (or social science) course (1 course): Students who select MTH 203 (for statistics) and MTH 217 (for modeling) are required to take an additional social science application course rather than an additional mathematics course. All other students take an additional mathematics course from the Courses of Instruction.
Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**MATHEMATICS**

164. Multidimensional Calculus.
Differentiation and linear approximation, extrema, Taylor series. Line, surface, and volume integrals; coordinate changes, Jacobians. Divergence theorem, Stokes’ theorem.

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. Required by Electrical and Computer Engineering majors.

Theory and applications of random processes, including Markov chains, Poisson processes, birth-and-death processes, random walks.

203. Introduction to Mathematical Statistics.

208. Operations Research I.
Linear and nonlinear programming, simplex method, duality theory, sensitivity analysis, shipping and assignment problems, Karmakar’s algorithm, genetic algorithms, game theory, genetic algorithms, flow problems.

Mathematical concepts and techniques underlying finance theory; arbitrage pricing theory and option pricing.

Elementary game theory with applications: Nash equilibria, prisoner’s dilemma, chicken; measures of voting power, social choice, Arrow’s Theorem.

235. Linear Algebra.
Finite-dimensional vector spaces over R and C axiomatically and with coordinate calculations. Forms, linear transformations, matrices, eigenspaces, inner products.

240. Introduction to Topology.
Review of set theory; metric spaces and topological spaces; functions and continuous functions; convergence, completeness, connectedness, and compactness; applications to surfaces.

265. Functions of a Real Variable I.
Real number system, continuity and uniform continuity, mean value theorems, bounded variation, Riemann-Stieltjes integral, sequences of functions.

**ECONOMICS**

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.

National income accounting concepts; their changes and fluctuations as explained by theories of income determination.

220. Fair Allocation.
Examines issues of distribution and justice from an economics perspective. Topics that may be examined include fair taxation, fair political representation, apportioning the cost of NATO among the members, and dividing outer space.

231. Econometrics.
Regression analysis applied to time series and cross-section data, simultaneous equations; analysis of variance.

256. Game Theory and Social Choice.
Game Theory and Social Choice/Topics in Game Theory.

273. Economic Growth and Development.
This course begins with the empirical facts of economic growth and how growth economists have struggled to explain the evidence. Questions that this course addresses include How rich are rich countries? How poor are poor countries? Why are there these differences?

274. Market Design.
This course is a required course for the Economics and Business Strategy major (organizations track) and will be valuable for advanced undergraduates majoring in economics, physics, and mathematics who are interested in pursuing graduate studies in economics. The course is concerned with the design of allocation mechanisms when economic agents have heterogeneous preferences and private information. Examples include the allocation of spectrum licenses to the operators of mobile phone networks, the decision as to whether to provide a public good, the allocation of men to women for dating purposes, and the allocation of
students to colleges. Basic results in the mechanism design and auction theories will be covered. Formal concepts used in the course include: mathematical expectation, conditional mathematical expectation, Bayes’ rule; the chain and the product rules for differentiation, integration by parts, optimization; extensive and normal form games, the Nash equilibrium, and the Bayes-Nash equilibrium.

282. Introduction to Positive Political Theory.
An introduction to some recent developments in explaining and evaluating government behavior.

288. Game Theory.
(Same as PSC 288)
The course is an introduction to the application of econometric methods. It covers the basic tools of estimation, inference and forecast of cross section, time-series and panel data models. The course emphasizes the intuitive understanding and practical application of these basic tools of econometric analysis.

POLITICAL SCIENCE

The graduate courses listed (4xx) are open to advanced undergraduates with permission of the instructor.

203. Survey Research Methods.
Offers an introduction to the understanding of politics through data analysis, with particular emphasis on surveys of the mass public.

205. Introductory Statistical Methods.
Introduces data analysis, statistical inference, and research design, with a focus on techniques that are appropriate for political science data.

272. Theories of International Relations.
How do we explain patterns of war and peace? Why do states with common interests often fail to cooperate? This course surveys theories of international relations, focusing on explanations of conflict and cooperation.

280. Communism and Democracy in Eastern Europe.
Provides an introduction to the post-war political and social history of Eastern Europe from the establishment of the Communist regime until the present.

The fundamental assumption of this course is that in most important political and social settings the ability of any actor to achieve her objectives is dependent on what she expects other relevant actors to do. This sort of interdependency is the defining feature of strategic interaction.

288. Game Theory.
Provides a unified approach to understanding social phenomena such as arms races, provision of public goods, competition between firms, electoral campaigns, and bargaining. There are no formal prerequisites, but an aptitude for logical or mathematical reasoning is desirable.

404. Probability and Inference.
This course in mathematical statistics provides graduate students in political science with a solid foundation in probability and statistical inference. The focus of the course is on the empirical modeling of non-experimental data. While substantive political science will never be far from our minds, our primary goal is to acquire the tools necessary for success in the rest of the econometrics sequence. As such, this course serves as a prerequisite for the advanced political science graduate courses in statistical methods (PSC 405, 505, and 506).

405. Linear Models.
In this course, we will examine the linear regression model and its variants. The course has two goals: (1) to provide students with the statistical theory of the linear model, and (2) to provide students with skills for analyzing data. The linear model is a natural starting point for understanding regression models in general, inferences based on them, and problems with our inferences due to data issues or to model misspecification. The model’s relative tractability has made it an attractive tool for political scientists, resulting in volumes of research using the methods studied here. Familiarity with the linear model is now essentially required if one wants to be a consumer or producer of modern political science research.

Elementary game theory applications (Nash Equilibria, Prisoner’s Dilemma, Chicken), measures of voting power, social choice (Arrow’s Theorem).
Mathematics

**Professor**

Frederick R. Cohen, PhD (Chicago)
  Professor of Mathematics

Michael E. Gage, PhD (Stanford)
  Professor of Mathematics

Steven Gonek, PhD (Michigan)
  Professor of Mathematics

Allan Greenleaf, PhD (Princeton)
  Professor of Mathematics

John R. Harper, PhD (Chicago)
  Professor of Mathematics

Alex Iosevich, PhD (California, Los Angeles)
  Professor of Mathematics

Saul Lubkin, PhD (Harvard)
  Professor of Mathematics

Carl Mueller, PhD (California, Berkeley)
  Professor of Mathematics

Douglas C. Ravenel, PhD (Brandeis)
  Daniel Burton Fayerweather Professor of Mathematics and Professor of Mathematics

**Associate Professor**

Dan A. Geba, PhD (Princeton)
  Associate Professor of Mathematics

Naomi Jochnowitz, PhD (Harvard)
  Associate Professor of Mathematics

Jonathon Pakianathan, PhD (Princeton)
  Associate Professor of Mathematics

Sema Salur, PhD (Michigan State)
  Associate Professor of Mathematics

Thomas Tucker, PhD (California, Berkeley)
  Associate Professor of Mathematics

**Assistant Professor**

Amanda Beeson, PhD (San Diego)
  Visiting Assistant Professor of Mathematics

Catalin Carstea, PhD (Chicago)
  Visiting Assistant Professor of Mathematics

Paul Fili, PhD (Texas)
  Visiting Assistant Professor of Mathematics

C. Douglas Haessig, PhD (California, Irvine)
  Visiting Assistant Professor of Mathematics

Mark Herman, PhD (Virginia Tech)
  Visiting Assistant Professor of Mathematics

Nsoki Mavinga, PhD (Alabama, Birmingham)
  Visiting Assistant Professor of Mathematics

John Olsen, PhD (Pennsylvania)
  Visiting Assistant Professor of Mathematics

Shannon Starr, PhD (California, Davis)
  Assistant Professor of Mathematics

**Lecturer**

Nicholas Rogers, PhD (Harvard)
  Lecturer; Director of Undergraduate Studies

**Professor Emeritus**

Norman L. Alling, PhD (Columbia)
  Professor Emeritus of Mathematics

Alfred Clark, Jr., PhD (MIT)
  Professor Emeritus of Mechanical Engineering, of Mathematics, and of Biomedical Engineering

Samuel Gitler, PhD (Princeton)
  Professor Emeritus of Mathematics

Johannes H. B. Kemperman, PhD (Amsterdam)
  Daniel Burton Fayerweather Professor Emeritus of Mathematics

Joseph Neisendorfer, PhD (Princeton)
  Professor Emeritus of Mathematics

Arnold K. Pizer, PhD (Yale)
  Professor Emeritus of Mathematics

David D. Prill, PhD (Princeton)
  Professor Emeritus of Mathematics

Ralph A. Raimi, PhD (Michigan)
  Professor Emeritus of Mathematics

Sanford L. Segal, PhD (Colorado)
  Professor Emeritus of Mathematics and of History

Norman Stein, PhD (Cornell)
  Professor Emeritus of Mathematics

Dorothy Maharam Stone, PhD (Bryn Mawr)
  Professor Emeritus of Mathematics

Teaching assistants are used to supervise recitation and review sections of first- and second-year courses.

Mathematics today is one of the most pervasive modes of thought—indeed a striking intellectual phenomenon of the past several decades is the use 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" mathematics, 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 major in almost any of the University’s liberal arts programs, in addition to those that 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 that may be useful for their educational and career goals, and to begin the necessary or recommended courses as early as possible.

More detailed and current information can be found on the department’s web page www.math.rochester.edu.
Course Information

There are three first- and second-year sequences in calculus:

- Students in the physical and engineering sciences normally choose the sequence MTH 161, 162, 164, 165. These courses are offered every semester.
- The sequence MTH 141, 142, 143, 164, 165 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 164 and 165. These courses are offered every semester.
- MTH 164 and 165 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 165, Linear Algebra with Differential Equations, to be completed by the end of the fall semester of the sophomore year. Other departments require MTH 163, Ordinary Differential Equations I, instead of MTH 165.
- The sequence 171Q, 172Q, 173Q, 174Q 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 majors who complete all four semesters will be excused from the requirement to take MTH 235. A high school AP calculus course or consent of the department is required to register for MTH 171Q.

Both the MTH 161–164 and MTH 171Q–174Q sequences may be entered with advanced standing and/or credit by students who do sufficiently well on a College Entrance Examination Board advanced placement exam.

Care is taken to ensure correct placement in the appropriate mathematics sequence during freshman orientation. Placement is based upon high school background and national placement tests. In addition, once classes have begun, students may choose, or the instructors may advise, transfer to a more suitable course numbered 200 or above (except for courses used to under the program in statistics. In addition, there is the minor in mathematics and the Certificate Program in Mathematical Modeling in Political Science and Economics.

BA in Mathematics

A set of foundational courses must be completed before acceptance into the major. The major requires eight courses of which three are core courses and five are advanced courses. In addition, students must satisfy the upper-level writing requirement.

Foundational Course Requirement

- The following foundational courses must be completed before acceptance into the major:
  - MTH 161. Calculus IA
  - MTH 162. Calculus IIA
  - MTH 164. Multidimensional Calculus
  - MTH 165. Linear Algebra with Differential Equations

Equivalent courses may be substituted for the above. For example, any of the mathematics honors courses MTH 171Q, 172Q, and 174Q may be substituted for the equivalent MTH 161, 162, and 164 courses, and MTH 173Q may be substituted for MTH 165. The sequence MTH 141–143 may be substituted for the sequence MTH 161–162. Credit granted for AP courses may be used to satisfy foundational requirements.

Core Course Requirement

Students must satisfy the following three requirements. An honors version of a course can always be substituted for the listed course.

- MTH 235. Linear Algebra—The requirement that MTH 235 be taken can also be satisfied by completing MTH 173Q. MTH 235 should be taken early in the students’ major program.
- One of the following:
  - MTH 236. Introduction to Algebra
  - MTH 240. Introduction to Topology
- One of the following:
  - MTH 201. Introduction to Probability
  - MTH 255. Differential Geometry
  - MTH 265. Functions of a Real Variable I
  - MTH 263. Ordinary Differential Equations I
  - MTH 282. Introduction to Complex Variables with Applications
  - MTH 285. Methods of Applied Mathematics

Advanced Course Requirement

In addition to the core courses, students must complete five advanced courses as follows:

- Three advanced mathematics courses: Any mathematics course numbered 200 or above (except for courses used to
satisfy the core course requirement) qualifies as an advanced mathematics course.

- Two additional advanced courses with substantial mathematical content: Courses that employ mathematical language, reasoning, or methodology qualify. Any mathematics course numbered 200 or above qualifies, as do certain non-introductory courses in other departments. The most common courses in other departments that qualify are courses of a quantitative nature from the social and physical sciences, engineering, computer science, or statistics, but there are other possibilities. Selections must be approved by the students’ departmental advisor.

**Sample Programs and Advice**

Students intending graduate work in mathematics should consider MTH 236, 237, 240, 265, 282, 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, 255, 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, 208, and 210.

The courses constituting a major in mathematics do not exhaust the students’ time in the junior and senior years. Prospective graduate students in mathematics would do well to learn to read a foreign language (French, German, or Russian). Other mathematical careers might involve a background in areas such as physics, biology, engineering, economics, or computer science.

Following are some typical examples of major programs. These are intended as suggestive, not prescriptive.

- Pure mathematics intending graduate study: MTH 201, 235, 236, 237, 240, 265, 282, plus one additional 200-level course.

**Honors BA in Mathematics**

A set of foundational courses must be completed before acceptance into the major. The major requires seven courses of which three are core courses and four are advanced courses. At least two of the advanced courses must be at the graduate level. In addition, an independent research project is required, and students must satisfy the upper-level writing requirement.

**Foundational Course Requirement**

- The following foundational courses must be completed before acceptance into the major:
  - MTH 171Q, Honors Calculus I
  - MTH 172Q, Honors Calculus II
  - MTH 173Q, Honors Calculus III
  - MTH 174Q, Honors Calculus IV

Alternatively, students may satisfy the foundational course requirement by completing MTH 161, 162, 164, 165, and 235. Equivalent courses may be substituted for the above. Credit granted for AP courses may be used to satisfy foundational requirements.

**Core Course Requirement**

- Students must complete the following three courses.
  - MTH 236H. Introduction to Algebra I (Honors)
  - MTH 240H. Introduction to Topology (Honors)
  - MTH 265H. Functions of a Real Variable I (Honors)

**Advanced Course Requirement**

In addition to the core courses, students must complete four advanced mathematics courses, at least two of which are at the graduate level. Any mathematics course numbered 200 or above (except for courses used to satisfy the core course requirement) qualifies as an advanced mathematics course. Any mathematics course numbered 400 or above qualifies as a graduate-level course.

**Independent Research Project**

Students work on an independent research project under the close supervision of a professor in the mathematics department, often their instructor in MTH 236H, 240H, 265H, or one of their graduate courses. Upon completion, students submit a written report on the project to the department Honors Committee and present a one-hour public talk at which the members of the committee are in attendance.

**Grade Point Average Requirement**

Students must complete the above program with at least a 3.25 grade point average in order to qualify for the honors BA in mathematics.

**BS in Mathematics**

A set of foundational courses must be completed before acceptance into the major. The major requires 11 courses of which five are core courses and six are advanced courses. In addition, students must satisfy the upper-level writing requirement.

**Foundational Course Requirement**

- The following foundational courses must be completed before acceptance into the major:
  - MTH 161. Calculus IA
  - MTH 162. Calculus IIA
  - MTH 164. Multidimensional Calculus
  - MTH 165. Linear Algebra with Differential Equations
172Q, and 174Q may be substituted for the equivalent MTH 161, 162, and 164 courses and MTH 173Q may be substituted for MTH 165. The sequence MTH 141–143 may be substituted for the sequence MTH 161–162. Credit granted for AP courses may be used to satisfy foundational requirements.

Core Course Requirement
- Students must complete the following five courses. An honors version of a course can always be substituted for the listed course.
  - MTH 235. Linear Algebra—The requirement that MTH 235 be taken can also be satisfied by completing MTH 173Q. MTH 235 should be taken early in the students’ major program.
  - MTH 236. Introduction to Algebra I
  - MTH 240. Introduction to Topology
  - MTH 265. Functions of a Real Variable I
  - MTH 282. Introduction to Complex Variables with Applications

Advanced Course Requirement
- In addition to the core courses, students must complete six advanced courses as follows:
  - Four advanced mathematics courses: Any mathematics course numbered 200 or above (except for courses used to satisfy the core course requirement) qualifies as an advanced mathematics course.
  - Two additional advanced courses with substantial mathematical content: Courses that employ mathematical language, reasoning, or methodology qualify. Any mathematics course numbered 200 or above qualifies, as do certain non-introductory courses in other departments. The most common courses in other departments that qualify are courses of a quantitative nature from the social and physical sciences, engineering, computer science or statistics, but there are other possibilities. Selections must be approved by the students’ departmental advisor.

BS in Applied Mathematics
A set of foundational courses must be completed before acceptance into the major. The major requires nine courses of which four are core courses and five are advanced courses. In addition, students must satisfy the upper-level writing requirement.

Foundational Course Requirement
- The following foundational courses must be completed before acceptance into the major:
  - MTH 161. Calculus I A
  - MTH 162. Calculus IIA
  - MTH 164. Multidimensional Calculus
  - MTH 165. Linear Algebra with Differential Equations

PHY 121. Mechanics
PHY 122. Electricity and Magnetism

Equivalent courses may be substituted for the above. For example, any of the mathematics honors courses MTH 171Q, 172Q, and 174Q may be substituted for the equivalent MTH 161, 162, and 164 courses, and MTH 173Q may be substituted for MTH 165. The sequence MTH 141–143 may be substituted for the sequence MTH 161–162. Credit granted for AP courses may be used to satisfy foundational requirements.

Core Course Requirement
- Students must complete the following four courses. An honors version of a course can always be substituted for the listed course.
  - MTH 235. Linear Algebra—The requirement that MTH 235 be taken can also be satisfied by completing MTH 173Q. MTH 235 should be taken early in the students’ major program.
  - MTH 201. Introduction to Probability
  - MTH 265. Functions of a Real Variable I
  - MTH 282. Introduction to Complex Variables with Applications

Advanced Course Requirement
- In addition to the core courses, students must complete five advanced courses as follows:
  - Three advanced mathematics courses: Any mathematics course numbered 200 or above (except for courses used to satisfy the core course requirement) qualifies as an advanced mathematics course.
  - Two additional advanced courses with substantial mathematical content: Courses that employ mathematical language, reasoning, or methodology qualify. Any mathematics course numbered 200 or above qualifies, as do certain non-introductory courses in other departments. The most common courses in other departments that qualify are courses of a quantitative nature from the social and physical sciences, engineering, computer science, or statistics, but there are other possibilities. Selections must be approved by the students’ departmental advisor.

Joint Major in Mathematics and Statistics
The details for this program are given under the listings for the statistics program.

Minor in Mathematics
A set of foundational courses must be completed before acceptance into the minor. The minor requires one core course and two advanced courses.
School of Arts and Sciences

Mathematics

Foundational Course Requirement
- The following foundational courses must be completed before acceptance into the minor:
  MTH 161. Calculus IA
  MTH 162. Calculus IIA
  MTH 165. Linear Algebra with Differential Equation
  and one of the following:
  MTH 150. Discrete Mathematics
  or
  MTH 164. Multidimensional Calculus

Equivalent courses may be substituted for the above. For example, any of the mathematics honors courses MTH 171, 172, and 174 may be substituted for the equivalent MTH 161, 162, and 164 courses, and MTH 173 may be substituted for MTH 165. The sequence MTH 141–143 may be substituted for the sequence MTH 161–162. Credit granted for AP courses may be used to satisfy foundational requirements.

Core Course Requirement
- Students must satisfy the following core course:
  MTH 235. Linear Algebra—The requirement that MTH 235 be taken can also be satisfied by completing MTH 173. MTH 235 should be taken early in the students' minor program.

Advanced Course Requirement
In addition to the core course, students must complete two advanced mathematics courses. Any mathematics course numbered 200 or above (except for MTH 235) qualifies as an advanced mathematics course.

Upper-Level Writing Requirement
The Department of Mathematics believes that the acquisition of the ability to write coherently on a mathematical topic, in a way that is acceptable to the general mathematical community, is an essential part of a successful major in mathematics.

To satisfy the mathematics department upper-level writing requirement, any student obtaining a degree in mathematics must pass two courses, which may be any of the following types: (1) an upper-level, 4-credit mathematics course carrying a W designation, including MTH 300W or MTH 302W; (2) MTH 391W, a 1-credit course, taken in conjunction with either MTH 174 or any 200-level mathematics course with the prior approval of the instructor, or independently of any course in consultation with a faculty member; or (3) at most one 4-credit course, approved in advance by the students’ advisor in the mathematics department, satisfying part of the upper-level writing requirement in another department.

Complementary Programs
Certificate in Mathematical Modeling in Political Science and Economics
The details for this certificate are given under the heading for Mathematical Modeling in Political Science and Economics.

Mathematics and Computer Science
Students interested in both mathematics and computer science are encouraged to pursue either a double major in mathematics and computer science, or a minor in mathematics and a major in computer science.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

130. Excursions in Mathematics.
The nature of mathematics and its application. Emphasis on concepts and understanding rather than acquisition of techniques. Intended for concentrators in the humanities and social sciences.

140A. Calculus with Foundations I.
Covers all the material in MTH 141 together with a thorough presentation of the standard precalculus material. Intended for students who lack the algebra and trigonometry skills necessary to perform successfully in MTH 141. MTH 140A (Fall) and MTH 141A (Spring).

141A. Calculus with Foundations.
This course is a continuation of MTH 140A. It combines and integrates the learning of calculus together with precalculus mathematics. MTH 141A (together with its prerequisite MTH 140A) covers all the material in MTH 141, together with a thorough presentation of the standard 'precalculus' material.

141. Calculus 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. MTH 141, 142, and 143 is a three-semester sequence that covers, at a slower pace, exactly the same material as the two-semester sequence, MTH 161 and 162.

142. Calculus II.
This course will consist of applications of the finite integrals, techniques of integration, calculus of the transcendental functions, improper integrals and the use of l’Hopital’s rule.

143. Calculus III.
This is the third semester of a three-semester calculus sequence. Topics include improper integrals, l’Hopital’s rules, infinite sequences and series, Taylor’s series, three-dimensional geometry and vector algebra, curves in space, partial derivatives.

150. Discrete Mathematics.
Logic, functions, algorithms, mathematical reasoning, mathematical induction, recurrence relations, techniques of counting,
equivalence relations, graphs, trees. Required for computer science majors.

161. Calculus IA.
Elementary real functions: algebraic, trigonometric, exponentials and their inverses and composites; their graphs, derivatives and integrals; limits, l'Hopital's rules, Mean value theorem, maxima and minima, curve plotting. The fundamental theorem of calculus, with geometric and physical applications. (Fall and Spring)

161Q. Quest Calculus IA.
The same material as MTH 161-162 but with an emphasis on understanding concepts as well as on learning techniques. Students contemplating majoring in mathematics as well as others desiring a strong foundation in calculus are encouraged to take this course or the honors sequence.

162. Calculus IIA.
Prerequisite: MTH 161 or equivalent.
Techniques of integration, improper integrals, applications to geometry and physics. Infinite series, Taylor series in one variable. Plane curves, parametric equations, polar coordinates, arc length. Note: Either MTH 164, 163, or 165 can be taken after MTH 162 or 143. (Fall and Spring)

162Q. Quest Calculus IIA.
The same material as MTH 161-162 but with an emphasis on understanding concepts as well as on learning techniques. Students contemplating majoring in mathematics as well as others desiring a strong foundation in calculus are encouraged to take this course or the honors sequence.

163. Ordinary Differential Equations I.
This course concentrates on the foundations of the subject, emphasizing those techniques which are important in physics and engineering. The emphasis in this course, as in the other calculus courses, is on learning techniques for solving, or at least understanding, certain equations (which occur frequently in physics and engineering), rather than on the theoretical aspects of the subject. Topics covered: first order differential equations, linear equations, and systems with constant coefficients, solutions in series, phase plane analysis and stability.

164. Multidimensional Calculus.
Differentiation and linear approximation, extrema, Taylor series. Line, surface, and volume integrals; coordinate changes, Jacobians. Divergence theorem, Stokes' theorem.

165. Linear Algebra with Differential Equations.
Matrices, vector spaces and linear transformations; differential equations: first-order, linear with constant coefficients, and linear systems; applications to science and engineering.

171Q. Honors Calculus I.
Credit—5 hours for each course in the 171Q-174Q sequence
Covers the material of MTH 161-164 in greater depth from the standpoint of both theory and applications. Students completing this sequence successfully will have met the requirements of MTH 235 and can begin taking upper-level courses immediately.

172Q. Honors Calculus II.
This is the second semester of the honors calculus sequence, covering the material from MTH 161, MTH 162, MTH 163, and MTH 164 in greater depth from the standpoint of both theory and application.

173Q. Honors Calculus III.
Credit—5 hours for each course in this sequence
An honors sequence covering the material of MTH 161-164 in greater depth from the standpoint of both theory and applications. Students completing this sequence successfully will have met the requirements of MTH 235 and can begin taking upper-level courses immediately.

174Q. Honors Calculus IV.
This is the last semester of the honors sequence of MTH 171, MTH 172, MTH 173, and MTH 174.

190. Topics in Problem Solving.
General techniques and approaches to solving difficult nonstandard problems such as those on the Putnam examination.

200. Transition to Higher Mathematics.
Techniques and methods of proof used in mathematics and computer science. Logical reasoning, mathematical induction, relations, functions. Applications to group theory or real analysis.

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. Required by electrical and computer engineering majors.

Theory and applications of random processes, including Markov chains, Poisson processes, birth-and-death processes, random walks.

203. Introduction to Mathematical Statistics.
208. Operations Research I.
Linear and nonlinear programming, simplex method, duality theory, sensitivity analysis, shipping and assignment problems, Karmarkar’s algorithm, genetic algorithms, game theory, genetic algorithms, flow problems.

Mathematical concepts and techniques underlying finance theory; arbitrage pricing theory and option pricing.

215. Fractals and Chaotic Dynamics.
Fractal geometry with applications to chaos theory and related computer software.

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

Elementary game theory with applications: Nash equilibria, prisoner’s dilemma, chicken; measures of voting power, social choice, Arrow’s Theorem.

Mathematical models in the social and biological sciences: axiomatic models, autonomous systems of differential equations; applications to biology and political science, including voting theory and Arrow’s Theorem.

230. Number Theory with Applications.
Divisibility, primes, congruences, quadratic residues and quadratic reciprocity, primitive roots, and selected topics, with applications to cryptography and computer science.

235. Linear Algebra.
Finite-dimensional vector spaces over R and C axiomatically and with coordinate calculations. Forms, linear transformations, matrices, eigenspaces, inner products.

236. Introduction to Algebra I.
Basic algebraic structures, including groups, rings, and fields with applications to specific examples.

236H. Introduction to Algebra I.
Honors version of MTH 236.

237. Introduction to Algebra II.
Continuation of MTH 236 covering field theory and Galois theory including proofs of the impossibility of trisecting angles, doubling the cube, squaring the circle, and solving 5th-degree polynomials.

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.

240. Introduction to Topology.
Review of set theory; metric spaces and topological spaces; functions and continuous functions; convergence, completeness, connectedness, and compactness; applications to surfaces.

240H. Introduction to Topology.
Honors version of MTH 240.

Sets, relations, mappings; equivalence, order; cardinals, ordinals, transfinite arithmetic; axiom of choice and equivalents.

Paths, circuits, trees; bipartite graphs, matching problems; unicursal graphs, Hamiltonian circuits, factors; independent paths and sets; matrix representations; planar graphs; coloring problems.

250. Introduction to Geometry.
Foundations of geometry; isometry, similarity, inversions; introductions to affine, projective, and non-Euclidean geometries.

Torsion, curvature; curves and surfaces in 3-space.

256. Differential Geometry II.
Riemannian geometry; selected topics.

263. Ordinary Differential Equations.
Theoretical approach to ordinary differential equations and the qualitative behavior of their solutions.

265. Functions of a Real Variable I.
Real number system, continuity and uniform continuity, mean value theorems, bounded variation, Riemann-Stieltjes integral, sequences of functions.

265H. Functions of a Real Variable I.
Honors version of MTH 265.

266. Topics in Real Analysis.
Continuation of MTH 265/265H. Possible topics: a rigorous exposition of Fourier analysis; multivariable analysis; elementary theory of Hilbert and Banach spaces.
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.

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.

282. Introduction to Complex Variables with Applications.
Complex differentiation and integration, analytic functions, singularities, residues, poles, power series, conformal mapping, with some applications. This course is independent of MTH 281.

Minimum principles; eigenvalues and dynamical systems; constraints and Lagrange multipliers; differential equations of equilibrium; calculus of variations; stability and chaos; nonlinear conservation laws.

290. Mathematical Biology.
Ordinary and partial differential equations, dynamical systems, and stochastic processes; applications to population biology, genetics, ecology, models of evolution, and DNA sequencing.

300W. History of Mathematics I.
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.

302W. History of Mathematics II.
The style and development of European mathematics from roughly 1650 to roughly 1950. The development of calculus and analysis, algebra, probability, geometry (including non-Euclidean geometry), set theory. The introduction of the idea of rigorous proof. This course is independent of MTH 300W.

391. Independent Study.
Independent Study in Mathematics. Special work arranged individually.

GRADUATE COURSES
The following graduate courses are open to advanced undergraduates with permission of the instructor.

436. Algebra I.
Rings and modules, group theory, fields and Galois theory.

437. Algebra II.
Multilinear algebra, quadratic forms, simple and semi-simple rings and modules.

440. General Topology.
Continuity; compactness, connectedness, metrizability; product spaces.

443. Algebraic Topology.
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.

453. Differentiable Manifolds.
Differentiable manifolds, mappings and embeddings, exterior differential forms, affine connections, curvature and torsion. Riemannian geometry, introduction to Lie groups and Lie algebras.

463. Differential Equations.
Classical PDEs, including the heat and wave equations, with both quantitative and qualitative analysis.

467. Theory Analytic Functions.
Cauchy theorems. Taylor and Laurent series, residues, conformal mapping, analytic continuation, product theorems.

471. Measure and Integration.
Lebesgue measure on the line; measure spaces; integration; convergence theorems; Radon-Nikodym theorem; differentiation; Fubini’s theorem; function spaces.

472. Functional Analysis.
Banach spaces; dual spaces; Riesz representation theorem; Hilbert spaces; Fourier series; projective and unitary operators; spectral analysis of completely continuous self-adjoint operators.

A more detailed description of other graduate-level courses may be found online at www.rochester.edu/GradBulletin.
Modern Languages and Cultures

**Professor**

Thomas DiPiero, PhD (Cornell)
Professor of French and of Visual and Cultural Studies; Senior Associate Dean of Humanities

Susan Gustafson, PhD (Stanford)
Karl F. and Bertha A. Fuchs Professor of German Studies

Kathleen Parthé, PhD (Cornell)
Professor of Russian

David Pollack, PhD (California, Berkeley)
Professor of Japanese

Claudia Schaefer, PhD (Washington University, St. Louis)
Rush Rhees Professor and Professor of Spanish

**Associate Professor**

Joanne Bernardi, PhD (Columbia)
Associate Professor of Japanese

John Givens, PhD (Washington)
Associate Professor of Russian

Beth E. Jörgensen, PhD (Wisconsin, Madison)
Associate Professor of Spanish

Cilas Kemedjio, PhD (Ohio State)
Associate Professor of French and of Francophone Studies

Ryan Prendergast, PhD (Emory)
Associate Professor of Spanish

Rául Rodríguez-Hernández, PhD (Cornell)
Associate Professor of Spanish

Donatella Stocchi-Perucchio, PhD (Cornell)
Associate Professor of Italian

**Assistant Professor**

Jennifer Creech, PhD (Minnesota)
Assistant Professor of German

Robert Doran, PhD (Stanford and Sorbonne)
Assistant Professor of French

June Hwang, MA (California, Berkeley)
Assistant Professor of German

William Schaefer, PhD (Chicago)
Assistant Professor of Chinese

**Senior Lecturer**

Andrée Douchin, PhD (Rochester)
Senior Lecturer in French

Laura Givens, MA (Washington)
Senior Lecturer in Russian

Berthe Kouroublakis, MA (NYU)
Senior Lecturer in Spanish

Anna Maslennikova, PhD (St. Petersburg)
Senior Lecturer in Russian

Luisa O’Keefe, MA (SUNY, Buffalo)
Senior Lecturer in Italian

Shino Fumino McLaughlin, RN (Kumamoto University)
Senior Lecturer in Japanese

Mariko Tamate, MBA (Temple)
Senior Lecturer in Japanese

Shifang Yu, BA (Fujian University)
Senior Lecturer in Chinese

**Lecturer**

Michelle Brown, MS (Brockport)
Lecturer in Spanish

Julie Papaioannou, PhD (Rochester)
Lecturer in French

Ping Pian
Lecturer in Chinese

**Professor Emeritus**

Philip R. Berk, PhD (Pittsburgh)
Professor Emeritus of French Literature

Wilhelm Braun, PhD (Toronto)
Professor Emeritus of German Literature

Patricia Herminghouse, PhD (Washington University)
Karl F. and Bertha A. Fuchs Professor Emerita of German Studies

Robert Horst, PhD (Johns Hopkins)
Professor Emeritus of Spanish

A supplementary staff of part-time faculty, foreign exchange students, and teaching assistants is assigned to aid in the instruction of language.

The Department of Modern Languages and Cultures offers programs of study in many of the major modern foreign languages, cultures, and literatures leading to the BA degree. The MA is awarded in comparative literature, French, German, and Spanish. Students interested in teaching should consult the Warner School for information on the MAT.

**Language Instruction**

Language instruction is offered 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 is based on the students’ previous training as determined by scores on placement tests, previous language study (AP, IB, etc.), and the departmental placement questionnaire. Departmental advisors are available during freshman orientation and preregistration periods as well as throughout the academic year.

Students with no previous exposure to a language should begin with the 101 course. Students with previous exposure to a language are encouraged to speak with a departmental advisor for placement at the appropriate level. Students are not permitted to register for or receive credit for a particular language course if they have already achieved proficiency at the level of that course. For courses 101–104 students are not permitted to register for a lower-numbered course after successfully completing a higher-numbered course.

Students with previous language study who 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 particular language. For nonmajors, 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 and the International Relations Certificate in combination with a language major offer students wider career horizons. Consult Simon School advisors or the Department of Political Science for more information.

The department offers the BA degree in comparative literature, French, German, Japanese, Russian, and Spanish; it offers minors in Chinese, comparative literature, French, German, Italian, Japanese, Russian, Spanish, and Latin American studies. For specific courses offered in each of these subject areas, please consult the undergraduate advisor for the program and the MLC website. Courses in Polish are also offered through MLC as part of the certificate program in Polish and Central European studies. (Instruction in Arabic, Classical Greek, Latin, and Hebrew is offered in the Department of Religion and Classics.)

Majors are balanced between advanced language preparation and literary and cultural studies. In many upper-level courses, the reading and most of the writing and coursework are in the original language. Students are strongly urged to strengthen their background for literary studies by taking related courses in English literature, film, fine arts, history, music, philosophy, religion and classics, visual studies, or women’s studies.

**Majors in Modern Languages and Cultures**

**Requirements and Recommendations**

All MLC majors follow a common model outlined below. Within each section specific course, requirements vary. Eleven courses are required for a major

- Five to seven area core courses (from the national language or comparative literature section); the language area core begins with 151–152. Students who place out of 151–152 take the equivalent number of additional electives, to be chosen in consultation with their advisor.
- Two to four area electives, decided upon in consultation with the undergraduate advisor for the section. Students who place out of 151–152 may take up to two courses in allied fields outside of the department.
- Two department-wide requirements (MLC core): CLT 101 or another approved CLT course introducing the critical study of language, literature, and culture. CLT 389 (Major Seminar).

**MLC Core**

**MLC 1: Introduction to Language, Literature, and Culture.** A primary examination of the concepts of culture, language, and literature, which form the foundation of the MLC program. This requirement may be fulfilled by any section of CLT 101 or by another CLT course chosen in consultation with the students’ advisor. This component should optimally be taken by the fall of the junior year.

**MLC 2: Major Seminar.** A department-wide seminar introducing students to the fundamental texts of comparative literary and cultural theory. Successful completion of the MLC Major Seminar qualifies students for consideration for admission to the honors program. Students are strongly urged to enroll in the Major Seminar as soon as feasible in their sophomore or junior year. The MLC Major Seminar is offered every semester.

**Comparative Literature**

The major in comparative literature provides students with work in a wide range of literature, culture, and with theoretical approaches to subjects such as popular culture, film, global media, and cross-cultural influences. This major is designed especially for students with interests in interdisciplinary approaches to literatures and cultures. The major in comparative literature consists of a minimum of 11 courses as follows:

Students are required to take the following courses:

- At least five courses in one area of literature and/or culture.
- Four courses either in a second area of literature and/or culture or four courses that emphasize theory in comparative literature or in related programs and departments (such as English, art and art history, film and media studies, philosophy, music), chosen in consultation with the advisor.
- The MLC core.

Students are expected to consult with the comparative literature undergraduate advisor before registering. Work completed in an approved study abroad program may be given major credit.

**French**

Students are required to take the following courses:

- Four core courses: FR 200, 202, 204.
- The elective core: Six other courses above the 205 level in French. In order to achieve a historical and cultural balance to the major, students must complete at least one course in literature prior to the nineteenth century, and one course in Francophone literature. This can include the following courses or other courses approved by the undergraduate advisor in French: FR 205, 206, 213, 240, and at least one of the following: FR 271, 272, 273, 278, 284. With the approval of the undergraduate advisor, up to two electives may be fulfilled by advanced-level courses taken in another department, in comparative literature, or by French 151 and 152 taken at the University of Rochester. All courses you intend to count toward the major must be approved by the undergraduate advisor.
- The MLC Core.

Students are expected to consult with the French undergraduate advisor before registering for courses.

Students are urged to consider studying in a French-speaking country for a year, a semester, or a summer. The University is affiliated with the IES program at Paris and Nantes, the Educational Programs Abroad internship in the French National Assembly, and the Paris Film Program. Work done in an approved study abroad program may be given major credit up to a maximum of four courses. Students are especially encouraged
to participate in the department’s six-week summer program in Reines, France.

Students intending to teach French at the secondary level or to do graduate work in French are advised to acquire a reasonable facility in another foreign language.

**German**

Students are required to take the following courses:

- Five core courses: e.g., German 151–152 (advanced language), 200 (Composition and Conversation), 202 (Introduction to German Cultural Studies), 203 (Introduction to German literature).
- The elective core: four additional courses: some possibilities: “Marx,” “German Cinema,” “Poe and Hoffmann,” “The Holocaust and After,” “Sexuality and Gender in the 18th and 19th Centuries,” “German Travel Writing.”
- The MLC core.

Students are expected to consult with the German undergraduate advisor before registering for courses.

Students are urged to consider studying in a German-speaking country for a year, a semester, or during the summer. The University is affiliated with the IES programs in Freiburg, Vienna, and Berlin, the Educational Programs Abroad internship programs in Bonn and Cologne, and the Berlin Summer Program. The German section also has a unique exchange program with the University of Cologne. Work completed in an approved study abroad program may be given major credit up to a maximum of four courses in German.

Students intending either to teach German 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**

Students are required to take the following courses:

- A total of 12 courses consisting of at least six consecutive language courses from the language series 101, 102, 151, 152, 202, 203, 205, 206 (or their equivalent in Japan); CLT 389; and the remainder to be chosen from 200-level JPN courses on Japanese culture.
- Culture emphasis: six consecutive courses in Japanese language; five additional courses from at least two different groups (culture, film, literature); and CLT 389 (MLC Major Seminar) or Senior Thesis (by application only).
- CLT 389 (MLC Major Seminar)/JPN 393 (Senior Honors Thesis). JPN 393 may be substituted for by permission only. JPN 393 is a two-semester course requiring extensive bibliographical preparation and research leading to a substantial research paper.

A study abroad program in Japan typically entails third-year Japanese and three or four Japan-related courses in English.

Work completed in an approved study abroad program may be given major credit up to a maximum of four courses in Japanese. Credit for study abroad must be arranged in advance with the major advisor.

**Russian**

Students are required to take the following courses:

- Core courses: at least two language courses at the 200 level (for example, 202, 209) and two courses in Russian literature, one of which is based in the nineteenth century, and the other in the twentieth century.
- Electives: students who choose to count 151–152 towards the major should choose at least three additional courses in Russian language, literature, or culture. Others choose five electives in Russian/Russian studies.
- The MLC core.

Students are strongly encouraged to work on their language skills throughout their program, both with courses at the University of Rochester (for example, 114, 204, 209) and, if possible, on our summer program in St. Petersburg (for which they receive up to 6 credits towards major requirements), or a semester-long program in Russia.

An interdisciplinary major in Russian studies is also available.

**Spanish**

Students are required to take the following courses:

- Three core courses: SP 200, 203, and 202 or 204.
- The elective core: six additional courses above the 200 level in Spanish. In order to achieve a reasonable balance to the major, students are encouraged to include at least one of the two culture courses, SP 205 or 206. With the approval of the undergraduate advisor up to two electives may be fulfilled by advanced-level courses taken in another department or by SP 151 and 152 taken at the University of Rochester.
- The MLC core.

Students are expected to consult with the Spanish undergraduate advisor before registering for courses.

Students 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 IES in Madrid, Barcelona, Granada, Salamanca, and Quito and with the Council on International Education Exchange with programs in Chile, the Dominican Republic, Argentina, and Brazil. (Latin America: IES Buenos Aires, Argentina; Santiago, Chile; Quito, Ecuador; Galapagos Islands, Ecuador; and Direct Enrollment at the Pontificia Universidad Católica del Perú, Lima, Perú.) Work completed in an approved study abroad program may be given major credit up to a maximum of four courses in Spanish.

Students intending either to teach Spanish 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.

**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 both literary and nonliterary texts of all kinds, from essay to film to fashion to comics. Advanced language courses provide further study of language itself, its production, history, and structure.

The department-wide program in comparative literature studies literary and cultural texts from perspectives which cross traditional boundaries and national frontiers. International by definition, comparative literature systematically and thoughtfully questions linguistic and cultural limits. It examines literature and other texts in relation to their historical context and establishes a dialog among art forms. Courses in comparative literature, all of which are taught in English, encourage the participation of students from all disciplines and emphasize the formation of critical attitudes and interpretive skills. Popular culture, globalization, media and technology, consuming texts, and issues of race, class, and gender all pertain to this program of study.

Minors in Modern Language and Cultures

Requirements and Recommendations
Five courses are required for the minor, which begins at the 151 level or above (101 for CLT).

Comparative Literature
The minor in comparative literature provides students with work in a wide range of theoretical issues as they relate to literature and culture within interdisciplinary contexts. Students take five courses in comparative literature and theory; some may be selected from other programs (e.g., English, art history, film and media studies), in consultation with the advisor. Students in a modern language may use some of their major courses toward a minor in comparative literature.

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 minoring in languages and cultures are urged to study abroad for a year, a semester, or during the summer. The University is affiliated with the IES programs in Freiburg, Nantes, Paris, Tokyo, Nagoya, Madrid, and Quito as well as with the Council on International Education Exchange programs in St. Petersburg, Beijing, Nanjing, and Fudan. Students are also encouraged to investigate internships available through Educational Programs Abroad in Bonn, Paris, and Madrid. Up to two advanced courses in an approved study abroad program may be approved for credit towards the minor.

Chinese
The minor in Chinese requires six courses beginning with CHI 101. Students may combine language, literature, and culture courses selected from the offerings of the Chinese section.

French
The minor in French requires five courses beyond FR 114. These will normally include FR 153 (Intermediate French), FR 200 (Advanced French), FR 202 (Introduction to French Literature), FR 204 (Contemporary France), FR 206 (French Cultural Traditions), and FR 157 and FR 207 (Summer Program in Rennes). With permission of the undergraduate advisor, another 200-level course may be substituted for one of the above. All courses you intend to count toward the minor must be approved by the undergraduate advisor.

German
The minor in German requires five courses beginning at GER 151. These normally include GER 151–152 (Intermediate German), GER 200 (Advanced German), GER 202 (Contemporary German Issues), and GER 203 (Introduction to German Literature). Study abroad may partially satisfy the requirements for the minor and is highly recommended.

Italian
The minor in Italian requires an intermediate level of competence in the language. Typically this can be achieved with the successful completion of IT 151. In addition, the minor requires four upper-level courses in Italian. IT 157/207 (Italian in Italy) and a maximum of two courses taken abroad within non–University of Rochester programs may be taken as partial fulfillment of the requirements for the minor in Italian. Students are encouraged to participate in the University of Rochester semester study on location in Arezzo, Italy. All credits at the level of IT 151 or above earned in the Arezzo Program can apply to the minor in Italian.

Japanese
The minor in Japanese requires five courses beginning with JPN 101. Students may combine language, literature, and culture courses selected from the offerings of the Japanese section.

Russian
The minor in Russian requires five courses beginning at RUS 151. Students may combine language and literature courses selected from the offerings of the Russian section of MLC.

An interdisciplinary minor in Russian studies is also available.

Spanish
The minor in Spanish requires five courses beginning at SP 151. These normally include SP 151–152 (Intermediate Spanish) and SP 200 (Advanced Spanish). Study abroad may satisfy some requirements of the minor.
Latin American Studies
The minor in Latin American studies can serve to complement the students’ major field of study by giving them a broad view of Latin American cultures and their relations 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 Modern Languages and Cultures, and two from related areas such as history, political science, and anthropology. The minor must be approved in its beginning stages by the Spanish program.

- Normal offerings in the Department of Modern Languages and Cultures:
  - SP 204. Spanish-American Literature: 1800 to Present
  - SP 206. Spanish-American Cultures
  - SP 255. Twentieth-Century Spanish-American Theater
  - SP 256. Contemporary Spanish-American Prose
  - SP 257. Modern Spanish-American Poetry
  - SP 261. Facing Facts: Spanish-American Nonfiction
  - SP 262. Topics in Spanish-American Literature
  - SP 262B. Cuba XXI
  - SP 262D. Literature and Culture of the Caribbean
  - HIS 203. Economies and Societies of Latin America
  - ANT 230. Culture, Class, Race in Latin America
  - PSC 268. Transitions to Democracy
  - REL 234. Cry Freedom: Liberation Theologies
  - Other courses with approval of the Spanish undergraduate advisor.

Upper-Level Writing Requirement
The upper-level writing component of majors in MLC focuses on both general (conceptual and theoretical) and specific (national) experiences of research, argumentation, composition, and editing and is satisfied by taking the two departmental core courses (CLT 101 and CLT 389) required of all majors.

Student Teaching
MLC majors interested in student teaching experience for the purpose of New York State certification should consult with the Margaret Warner Graduate School of Education and Human Development as well as with their advisor.

Study Abroad Opportunities
The department actively encourages students to seek a minimum of one semester of foreign study. Work completed in an approved study abroad program may be given major credit up to a maximum of four courses in French, German, Italian, Japanese, Russian, and Spanish. Students interested in studying abroad should consult with their departmental advisor and seek the assistance of the College Center for Study Abroad and Interdepartmental Programs located in 206 Lattimore Hall. Modern languages and cultures offers summer study abroad.

Semester and Academic Year Programs
The University is affiliated with the Institute for the International Education of Students (IES), which offers semester and academic year programs in France (Paris, Nantes), Japan (Tokyo and Nagoya), Spain (Barcelona, Madrid, Salamanca, and Granada), and Argentina (Buenos Aires), Ecuador, Chile, Italy, Austria, Germany as well as with the Council on International Education Exchange programs in Russia (St. Petersburg), the People’s Republic of China (Beijing, Nanjing), Senegal, Taiwan, and Paris. Qualified students may also participate in internship programs in the German Bundestag, European Parliament, as well as in various political, business, medical, and arts internships in Berlin, Bonn, Brussels, and Madrid. Students may also study at Pontificia Universidad Católica del Perú; and at Meiji Gakuin University in Tokyo. The Skalny Center for Polish and Central European Studies provides students with an opportunity to develop an interdisciplinary knowledge of Polish and Central European politics, history, cultures, and international relations with Eastern (Russia/Soviet Union/Post–Soviet States) and Western Europe, as well as with the United States. An interdepartmental major or minor in Polish and Central European studies (PCES) may be designed through the Skalny Center and is administered through the College Center for Study Abroad and Interdepartmental Programs. The Skalny Center itself offers a Certificate in Polish and Central European Studies, and a study abroad program in Poland. Upperclass students are eligible to compete 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.

Study on Location in Arezzo, Italy, Special Degree Program in Italian Studies. The University of Rochester currently offers a one-semester, interdisciplinary program in Italian studies in Arezzo, Italy. The program is directed on campus by Professor Stocchi-Perucchio (Italian) and an advisory committee, in collaboration with a University of Rochester–appointed director on location, Donna Logan. The program is directed by University of Rochester faculty on a rotating basis and administered through the College Center for Study Abroad and Interdepartmental Programs.

The Arezzo program takes place in the fall, offers 16 credits, and may be taken as partial fulfillment of the requirements:

- for the minor in Italian
- for an individualized interdepartmental major in Italian studies

Students may propose an interdepartmental major through the College Center for Study Abroad and Interdepartmental Programs.

Summer Programs
Modern languages and cultures (MLC) sponsors special intensive language programs abroad during the summer for students of French in Rennes, France; for students of German in Berlin, Germany; for students of Italian in Padua, Italy; for students of Spanish in Quito, Ecuador, and Oaxaca, Mexico; and for
students of Russian in St. Petersburg, Russia. Some programs require the completion of one semester of foreign language studies at the University (consult with program). Through the bequest of Mildred R. Burton, summer study grants to University of Rochester programs are available in annual competitions administered by the department.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

COMPARATIVE LITERATURE

101. Topics in Comparative Literature.
An introduction to the study of literature and culture in a comparative and theoretical context. Close critical scrutiny of cultural difference as manifested in a variety of literary texts and cultural phenomena. Topics vary and include Historical and Imaginary Paris; Barcelona and the Cultures of the Mediterranean; Cowboys and Indians; Mexico City, Global Metropolis; Napoleon: Image, Myth, History.

114Q. Great Cities: Edo 1600–1850.
Edo (modern Tokyo) began around 1600 as the shogun’s administrative center for all Japan. For centuries only a tiny fishing port, Edo quickly became a bustling and picturesque urban center, and by 1750 was the largest city in the world. This course examines Edo as historical, political, urban, social, religious, and artistic artifact, exploring the various forces contributing to the creation and shaping of the city, to discover how people lived in and understood this novel environment. The course is taught in English.

212A. Monsters, Ghosts, and Aliens.
This course focuses on the horror genre as popular entertainment in Germany, England, and the US in the 19th and 20th centuries. Particular attention will be paid to the construction of “others” as monsters in literature and film (Frankenstein, Vampires, Devils, Aliens, etc.). Authors/filmmakers include: Hoffmann, Poe, Shelley, Stoker, Jackson, Rice, Harris, King, Murnau, Jordan, Wise, Siegel, Kubrick, Demme. This course is part of the Horror in Literature & Film Cluster.

214E. Japanese Animation (anime).
An exploration of Japanese popular culture through the world of anime. Films cover a wide range of subgenres, from Hayao Miyazaki’s The Castle of Cagliostro to more recent works including Akira (cyberpunk), Silent Mobius, and Neo-Tokyo (futuristic manga adaptations), Robot Carnival (battling robots, androids), Grave of the Fireflies (postwar nostalgia). Discussions address issues of landscape (city vs. “furusato”), period, fantasy, gender (male, female, androgynous), racism (self vs. other), cultural anxiety. Screenings are held in tandem with an anime series at the George Eastman House. Class taught in English with additional instruction in Japanese as required for majors.

215A. Russia Goes to the Movies.
In Russia, the dawning of the age of movies coincided with the birth of the Soviet state. According to Lenin, the most revolutionary of the arts was also to be the art of the Revolution. Yet Soviet directors, from Eisenstein to Tarkovsky, were also among the world’s most influential filmmakers. This class looks at these artistically interesting and popular films while exploring the changing relationship between politics, experimentation, and entertainment in Russian cinema, always mindful of the backdrop of totalitarian society and the nature of mass culture in general. Topics include Innovation and Ideology; From Hollywood to High Stalinism; Popular Patriotism; The Thaw in Cinema after Stalin’s Death; From High Hopes to Stagnation (the sixties and seventies); The Last Days of Soviet Film and the New Russian Cinema. No knowledge of Russian required. Attendance at weekly screenings is mandatory.

216C. Women in Hispanic Film.
Examine images of women in a variety of films from Latin America and Spain. Topics range from the use of “the feminine” in war propaganda, to films of the Franco dictatorship, and from Latin American political documentaries to popular commercial films. Emphasis on cinematic representation as visual ideology, and on films at the millennium. Class taught in English. Written work in Spanish for SP credit.

222A. Sexuality and Gender: Eighteenth-Century Representation.
This course explores 18th century conceptions/constructions of the body, sexuality, and gender as manifest in medical papers, handbooks, aesthetic essays, and literary works to include Lessing’s Laocoon and Philotas, Fielding’s The Female Husband, Defoe’s Moll Flanders, Clandest’s Fanny Hill, de Sade’s Justine, Goethe’s Gotz von Berlichingen, Kleist’s Holy Caecilia and Puppet Theater, Diderot’s The Nun, Shelley’s Frankenstein. Additional theoretical readings include: Foucault, Kristeva, Butler, Sedgwick, Gilman, Habermas, Cassirer, Todorov, Laqueur, and G.S. Rousseau.

231B. Madness and Post-Colonial Literature.
This course will explore inscriptions of madness in post-colonial African and Caribbean texts. Beyond the obvious and visible signs of what is generally termed “madness” (from the pathological to the political or cultural), we will ask ourselves if the post-colonial arena cannot be interpreted as a pervasive manifestation of madness, that is to say, of something fundamentally “alien, foreign” to the Known, to the imperial destructuring order, and to the disarticulated colonial and post-independent communities. By bringing together texts from different and diverse cultural and intellectual areas such as France, Guadeloupe, and Africa, we seek to confront the various “scriptures.” Issues of witch-hunt, of disintegration of Juletane, the Antillean women in West Africa, from Foucault’s normative panopticism to Fanon’s discussion of
the black experience, the postcolonial situation, articulated or silenced, will be the focus of this course. Taught in English.

**236B. U.S. Latinos/Latinas.**
Introduction to U.S. Latino/a writing and culture in its rich geographic and ethnic diversity; Latinization of the American landscape; exile, immigration, cultural syncretism.

**265E. Dangerous Texts.**
When modern Russian literature began to evolve in the mid-1600s, the printed or written text was immediately seen as a potential danger to the power of Church and State. In this course we will examine dangerous texts’ from the 17th century to the present to see what aspects of texts and their authors were seen as threats and how these threats were dealt with. We will also see the ways in which writers did indeed perceive themselves as a second government’ and how this changed the way they wrote. The reading list will include works by: Avvakum, Radishchev, Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, Babel, Mayakovsky, Mandelstam, Pasternak, Yevtushenko, Solzhenitsyn, Voinovich, Grossman, and Sinyavsky/Tertz. The goal of this course is to arrive at an understanding of the unique role played by literature in Russian history. In English.

**281B. Psychoanalysis and Literature.**
How does literature “think”, and what does it think about? Why are so many literary texts about love, death, and/or people finding out about who they are? Reading literature with psychoanalytic theory, we will discuss the formation of subjectivity, perspective, the gaze, and love and death; we will ask how literature communicates things that no other form of language can.

**282B. Nietzsche and the Nietzscheans.**
Friedrich Nietzsche continues to be one of the most influential modern philosophers, yet controversy surrounds almost every aspect of his life and work. This course will help students go beyond the controversy in order to consider Nietzsche’s texts discerningly and how he approached the problems of truth, power, and morality. Close examination of his most important writings will be complemented by inquiry into Nietzsche’s effects on twentieth-century philosophy. Other thinkers include Martin Heidegger, Michel Foucault, Sarah Kofman, Jacques Derrida and Giles Deleuze.

**CHINESE**

**101. Elementary Chinese I.**
*Credit—6 hours*
This course is designed for beginners of Chinese. It introduces students to the sounds, basic sentence structures, and the writing system of Mandarin Chinese. Pinyin, the phonetic translation system, is taught and required throughout the course. Emphasis will be on developing listening and speaking skills as well as building a vocabulary based on 400 ideographic characters.

**102. Elementary Chinese II.**
This course is the continuation of Chinese 101. Knowledge of Pinyin is required. The focus continues to be on developing listening and speaking skills with an increasing emphasis on reading and writing in ideographic characters. It aims to build a vocabulary based on 500 characters.

**151. Intermediate Chinese I.**
This course is the continuation of Chinese 102. Knowledge of the Pinyin system is required for the purpose of pronunciation. The course continues to focus on developing communicating skills with an increasing emphasis on reading and writing in ideographic characters and expanding vocabulary. Course work includes two weekly recitation sessions and lab work at the multimedia center.

**152. Intermediate Chinese II.**
Continuation of Chinese 151, Intermediate Chinese I. Princeton’s “Intermediate Chinese” will be used. Supplementary materials will include short selections from contemporary Chinese writings. Written compositions in Chinese are required. A study of modern colloquial and literary styles, drawn from contemporary writings, readings, and movies scripts in material of social and cultural interests. Basic grammar and syntax will be constantly reviewed. Special emphasis will be devoted to the expansion of reading vocabulary, sentence patterns, writing and oral skills.

**202. Advanced Intermediate Chinese I.**
This course covers various aspects of contemporary Chinese culture as found in magazines, journals, television, film and videos. Class taught in Chinese.

**203. Advanced Intermediate Chinese II.**
This course covers various aspects of contemporary Chinese culture as found in magazines, journals, television, film and videos. Class taught in Chinese.
**204. Advanced Conversational Chinese.**
Study abroad course.

**210. Introduction to Traditional Chinese Culture.**
An overview of China’s traditional culture through the most prominent examples of its visual, literary, and performing arts, with attention to the social contexts of aesthetic experience.

**232. Asian Calligraphy: History and Practice.**
An introduction to the Chinese and Japanese writing systems, including their historical development, artistic practices, and practical applications. One meeting per week will be devoted to the study of calligraphy. Ideal for those studying Chinese or Japanese, but experience in the languages, while helpful, is not required.

**FRENCH**

NOTE: FR 200 and 202 are ordinarily prerequisites for all 200-level courses in French literature. Many 200-level courses are cross-listed with CLT and/or film and media studies, visual studies, women’s studies.

**101. Elementary French I.**
French 101 is an introductory language course. Students learn fundamentals of grammar, and pronunciation in the context of French culture. Emphasis is on developing communicating skills, principally speaking but also including listening, reading and writing. There is an obligatory recitation section twice a week in addition to the main class and the work in the multimedia center.

**102. Elementary French II.**
French 102 continues the work of the beginning course. There is an additional emphasis on reading comprehension and vocabulary building.

**114. Conversational French.**
This course will use short readings on a variety of topics to encourage development of speaking skills. Emphasis on oral practice and acquisition of vocabulary from the book. May be taken concurrently with FR 151 or FR 152 and may be taken twice for credit.

**151. Intermediate French I.**
Continuing study of French in its spoken and written forms. Readings in modern French culture and literature will provide a basis for improvement of language skills. Emphasis will be placed on both personal expression and the development of critical reading technique.

**153. Intermediate French.**
Intermediate French. Development of oral and written skills through the exploration of specific topics and themes. Emphasis on grammatical forms and idioms.

**155. French Conversation and Composition.**
The most advanced conversation and composition course aims to bring students to a level of proficiency with the spoken language, including its idiomatic forms, and to refine composition skills. Course materials include extensive use of popular French culture, including film.

**157. French in France.**
French in France is a month-long conversation and culture course held in Rochester’s Breton sister city, Rennes. Students meet in Paris for several days of orientation by University of Rochester program director and travel together to Rennes. Students are hosted by families who provide housing, meals, and opportunities for language and culture encounters. Excursions include the medieval abbey of Mont St. Michel, the old port of St. Malo, and the landing beaches of Normandy. The program fee includes language instruction, family stay, and excursions. Special application required.

**158. Francophone Studies.**
Francophone studies is a four-week summer course in French language and francophone culture given in a native French speaking country. (Higher-level students may register for FR 208.)

**159. Paris and Normandy: Sites of Memory.**
Credit—2 hours.
See course 213 for description.

**200. Advanced French.**
Intensive practice in reading, writing, and speaking French, based on rigorous grammar review and on close readings of literary and cultural texts. Classroom work emphasizes grammar, speaking, reading and writing French.

**202. Introduction to Literature in French.**
This course is designed to provide students with intensive practice in reading French from a wide variety of sources. Texts drawn from literature, popular culture, journalism and other specialized fields will be read and discussed with an eye toward improving students’ comprehension, developing their vocabulary, and expanding their interpretive and analytic capabilities.

**204. Contemporary French Culture.**
This course is designed to provide students with a comprehensive view of French Contemporary culture through major trends of French cultural, political, and intellectual life in the recent years. While we cannot study factual representations of French culture, we will attempt to establish a conceptual framework that would help us in the understanding of complex questions such as What does it mean to be French?, What is France? What is French culture?, etc.
206. French Cultural Traditions.
What was going on in French and francophone culture before the 19th century? Plenty! A Renaissance, a revolution, royal intrigues, religious wars, gender conflict, colonial expansion, and a cat massacre. Students will study the literary and cultural history of premodern periods.

207. French in France.
French in France is a month-long conversation and culture course held in Rochester’s Breton sister city, Rennes. Students meet in Paris for several days of orientation by University of Rochester program director and travel together to Rennes. Students are hosted by families who provide housing, meals, and opportunities for language and culture encounters. Excursions include the medieval abbey of Mont St. Michel, the old port of St. Malo, and the landing beaches of Normandy. The program fee includes language instruction, family stay, and excursions. Special application required.

208. Francophone Studies.
Francophone studies is a four-week summer course in French language and francophone culture given in a native French speaking country. (Higher-level students may register for FR 208.)

212. A Course in French Translation.
A Course in French Translation” is intended for those who wish both to improve their comprehension of the written text and to interpret it at an appropriate stylistic level through translation into English. The course will be based on a great variety of texts, elementary to highly sophisticated, belles-lettres to scientific, selected both by the teacher and by the students. Some oral practice will be introduced as well. A basic reference work, combining grammar and texts, will be required.

213. Paris and Normandy: Sites of Memory.
This course intends to explore the representations of Paris and Normandy (the landing beaches of Normandy) in literary and visual representations. Beyond the cultural riches of Paris and Normandy, this course intends to familiarize students with the complexities of cultural representation. It also seeks to provide students who are considering to study in Paris and Rennes with tools that will prepare them for the complexities of cultural encounters, that will prepare them for the excursions in the landing beaches of Normandy, a highly emotional and historical place where the United States and France meet. This course is strongly recommended for students who plan on taking FR 217/207 (French in France). All other students are welcome. Reading list includes Les Lettres persanes (Montesquieu), Bel ami (Maupassant), Le Petit prince de Belleville (Calixthe Beyala). Films and videos include Saving Private Ryan, La Haine, Paris at the Time of Balzac, and more. Taught in French.

Study of major authors of the French Enlightenment, as well as their predecessors and contemporaries, including Marivaux, Montesquieu, Voltaire, Prevost, Rousseau, Diderot, Sade, and Laclos.

230. French Social Thought.
This course examines the singular contribution of French thinkers to the development of the social sciences (or the “sciences of man,” as they are known in France) in the twentieth century. We will examine the theory of gift exchange in Marcel Mauss, the rise of structural anthropology in Claude Lévi-Strauss, the sociology of Pierre Bourdieu, and the theories of religion and culture of René Girard and Marcel Gauchet. We will also study post-structuralist thinkers such as Jacques Derrida and Jean-Luc Nancy when their work touches on issues of society and religion. Class taught in English.

Analysis of selected works by major nineteenth-century novelists including Balzac, Stendhal, and Flaubert.

233. Realists and Romantics.
Nineteenth-century French literature witnessed two competing literary currents: romanticism and realism. Romanticism, heir to the logic and reason of the French Enlightenment, sought to rescue from scientific systematization the wonder and awe of nature; realism attempted to describe the world exactly as it was. This course examines the confrontation of these two movements, and attempts to discern what made each distinct, as well as what features they may unwillingly have shared. Do realistic novels romanticize their subjects? What’s true to life in romantic descriptions of nature? How do aesthetic concerns become social or political ones? Readings include Constant, Chateaubriand, Flaubert, Rimbaud, Baudelaire, and Maupassant.

240. Le Roman Francais.
This course looks at the history of the French novel, from its early history in the late 17th century, through the philosophic and great realistic traditions of the 18th and 19th centuries, and up to and including recent works of fiction. We will study the form and function of the novel, as well as the narrative structures and forms of verisimilitude that authors chose to develop. Authors will include Mme de Lafayette, Voltaire, Diderot, Flaubert, Robbe-Grillet, and others. Readings and class discussion primarily in French.

243. Mutilated Bodies, Mutilated Discourse.
Transnational sisterhood or cultural imperialism? Legitimate ritualized practice or outdated violent ritual? Genital cutting, female circumcision, female genital surgery? The controversy over this practice already begins with the act of naming. If there seems to be a consensus about the physical violence imposed
on the female body, why is it that western feminist discourse is suspected of perpetuating the mutilation African voices? This course seeks to provide an understanding of the context in which a fragmented 'transnational sisterhood' allows for a proliferation of mutilated discourses on mutilated postcolonial bodies. Readings and Films include Alice Walker (Warrior Marks), Florence Ayissi Fauziya Kassindja (Do They Hear You When You Cry), Maryse Conde and more critical and theoretical readings from African, French and North American authors. In English.

This course is a study of Black Paris, as imagined by three generations of Black cultural producers from the United States, the Caribbean and Africa. Paris is as a space of freedom and artistic glory that African American writers, sorlders and artists were denied back home. For colonized francans, and Antilleans, Paris was the birthplace of the Negritude, the cultural renaissance informed by the dreams and teachings of the Harlem Renaissance. Black Paris, for the young generations caught in the marginal space of poor suburbs, calls to mind images of burning cars, riots, dilapidated schools that are rendered through rap music, hip-hop that are weaving the thread of a new youth-oriented transnational imagination.

248. Poets and Painters.
In this course students study the relationship between French poetry and painting from about 1868 to 1968, primarily focusing on the twentieth century. The course examines literary movements that affected painting and artistic movements that entailed new ways of writing. Through this students can also examine other collaborative arts such as music, dance, and theater. Poets include Mallarme, Valery, Ponge, Michaux, Char, Jacottet, Apollinaire, and less-known writers. Course and readings primarily in French.

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.

261. The Twentieth-Century Novel.
A survey of the major literary movements of the twentieth century, with special attention to intellectual and social contexts that engendered them.

261A. Contemporary French Novel.
This course explores the development of the French novel from 1930 to today. Course, readings, and discussion are all in French.

264. Contemporary French Thought.
This course is a survey of the major intellectual movements of the twentieth century. Beginning with Ferdinand de Saussure and the study of the linguistic sign, we move on to consider cultural anthropology and the invention of structuralism. Finally, the course takes a detailed look at Derridean deconstruction, the movement that has influenced so much Anglo-American criticism, and we conclude with a brief foray into other forms of poststructuralism.

271. Introduction to Francophone Literature.
This course surveys Francophone African and Caribbean literature from its beginnings in the 1940s to the postcolonial age. Study includes major trends and texts that have shaped the emergence of a genuine Francophone literary tradition. Issues of cultural confrontations, exile, panafricanism, diasporic migrations and interactions, race, class, and gender in African and Caribbean postcolonial societies are addressed through a close reading of texts. Movies are used as an integral part of this course and help in the understanding of the concept.

272. Madness and Post-Colonial Literature.
This course will explore inscriptions of madness in post-colonial African and Caribbean texts. Beyond the obvious and visible signs of what is generally termed “madness” (from the pathological to the political or cultural), we will ask ourselves if the postcolonial arena cannot be interpreted as a pervasive manifestation of madness, that is to say, of something fundamentally “alien, foreign” to the Known, to the imperial destructuring order, and to the disarticulated colonial and post-independent communities. By bringing together texts from different and diverse cultural and intellectual areas such as France, Guadeloupe, and Africa, we seek to confront the various “scriptures.” Issues of witch-hunt, of disintegration of Juletane, the Antillean women in West Africa, from Foucault’s normative panopticism to Fanon’s discussion of the black experience, the postcolonial situation, articulated or silenced, will be the focus of this course. Taught in English.

This course is a study of major Caribbean novels and major theoretical texts. The reading will be structured around the notion of “Antillanite” or Creolization elaborated by Martinican Edouard Glissant and his heirs Chamoiseau and Confiant of the “Creolité” movement. The controversial presence of the Other (Africa and France) in the Caribbean, the need to build a Caribbean authenticity in order to participate freely in what Glissant terms “Relation planetaire” (Planetary Relations) will also be thoroughly examined.

275. Psychoanalysis and Literature.
How does literature “think,” and what does it think about? Why are so many literary text about love, death, and/or people finding out about who they are? Reading literature with psychoanalytic theory, we will discuss the formation of subjectivity, perspective, the gaze, and love and death; we will ask how literature communicates things that no other form of language can.

276. Contemporary Women’s Writing and French Feminism.
This course primarily deals with contemporary novelists and critics whose work focuses on gender and identity construction in a
French//Francophone context. The course studies the changes in French feminism and women's writing since 1968. A major focus of the course is the changing political and social role of women writing in French and how these voices differ from those of previous eras. Primary texts include works by Cixous, Kristeva, Ndiaye, Redonnet, Yourencar, Wittig, and Le. Readings and discussion are in French.

277. Post-Structuralism to Post-Modernism.
This course is designed to offer a critical examination of the major developments in French theory from poststructuralism to postmodernism. The course is organized around close readings of selected essays by authors whose work has had a powerful impact within the development of French thought and in the United States. Our readings focus on the relation of philosophy and critical theory to literature, history, politics, and power.

This course is a study of the Francophone African Novel from North Sub-Saharan African, and from Madagascar. The course will explore the political and cultural contexts that gave rise to the modern African literature in general, and to the modern African Novel in particular.

280. French Film: The New Wave.
A study of French film from its beginnings through the New Wave.

281. History of French Film.
This course surveys the history of French cinema from its early experiments through the “Tradition of quality” to the moment immediately preceding the emergence of the New Wave. Films selected from the work of the following directors are studied: Lumiére, Méliès, Gance, Dulac, Léger, Clair, Vigo, Renoir, Carné, Ophulus, Pagnol, Clément, and Bresson. Readings include contemporary critical and theoretical discussions, as well as historical analyses.

283. Contemporary French Film.
Through close analysis of popular film, this course explores contemporary French culture as it reworks national identity. Focusing on changing definitions of “Frenchness,” the course examines its articulations with shifting conceptions of tradition, of the popular, and of the nation. Readings include central cultural conflicts around identity and difference in the context of the emergent European economic community, as well as the specifically French context of “immigration” and “assimilation.”

289. Major Seminar.
291. Independent Study.
293. Senior Project.

GERMAN

NOTE: GER 100 and 102 or their equivalents are normally prerequisites for all 200-level courses taught in German. Many 200-level courses are cross-listed with CLT and/or film and media studies, visual studies, women’s studies and are taught in English and do not have prerequisites.

101. Elementary German I.
This is the first semester of a two-semester sequence using an exciting new interactive approach to language learning. Students are encouraged, right from the start, to communicate in German utilizing basic vocabulary and authentic expressions in their spoken and written work. Listening comprehension is honed using audio taped material featuring a variety of native speakers, while a series of video tapes provide a basic introduction to the cultures of German speaking countries.

102. Elementary German II.
This is the second semester of a two-semester sequence using an exciting new interactive approach to language learning. Students are encouraged, right from the start, to communicate in German utilizing basic vocabulary and authentic expressions in their spoken and written work. Listening comprehension is honed using audio taped material featuring a variety of native speakers, while a series of video tapes provide a basic introduction to the cultures of German speaking countries.

114. Conversational German.
This is a good way to improve your speaking skills and/or stay in touch with German while you are too busy to enroll in a regular course.

151. Intermediate German I.
Process writing, reading, and listening exercises provide the context in this course for a thorough review of German grammatical structures. Students are expected to write short, weekly essays, complete weekly assignments in listening, and hone their speaking skills through active class participation. Goal of this two-semester sequence is communicative proficiency. The ‘Zertifikat Deutsch als Fremdsprache’ examination, attesting to this proficiency, is offered at the end of each spring semester.

152. Intermediate German II.
Process writing, reading, and listening exercises provide the context in this course for a thorough review of German grammatical structures. Students are expected to write short, weekly essays, complete weekly assignments in listening, and hone their speaking skills through active class participation. Goal of this two-semester sequence is communicative proficiency. The ‘Zertifikat Deutsch als Fremdsprache’ examination, attesting to this proficiency, is offered at the end of each spring semester.
157. German in Germany.

Students experience the excitement of Berlin, historic center of Germany and capital of the re-unified state. Students stay in the international center of the European Academy located in picturesque Grunewald. Mornings are devoted to intermediate or advanced German language classes and individual work; afternoons and weekends are free for exploring and for excursions to nearby Dresden, Potsdam, and Baltic seashore. Program fee includes ground transportation in Germany, lodging and breakfasts, and main meals at the European Academy in Berlin, German language instruction, and some excursions. Special application required.

200. Advanced Conversation and Composition.

This class assumes enough knowledge of the language for reading somewhat longer fictional and nonfictional texts and viewing German films in the original. The class is organized around general topics and themes. Students will write weekly essays in German on select topics. Class taught in German.

202. Introduction to Cultural Studies.

This is one of several core classes required for the major. Students should have completed at least 152 and preferably 200. This course will introduce students to basic principles of cultural analysis at the heart of the discipline of German Studies. Emphasis will focus on how the media act to form and facilitate various aspects of issues in contemporary German culture.

203. Introduction to German Literature.

Everything you ever wanted to know about German literature but were afraid to ask. This course looks at German poems, plays and novellas from various historical periods and within the context of several techniques of interpretation. It is designed to prepare students for sophisticated analysis of literary texts.

204. Marx and Marxism.

It is not overstated to say that the works of Karl Marx have provided the transformational impulse to many of the changes of the 20th century. Who was this person, Karl Marx? Why is it that in this post-Cold War world his writings continue both to inspire and threaten contemporary readers? How have those inspired by Marx further developed his ideas to constitute the discourse of Marxism? In this course we will begin with discussions of key works by Marx. We will then move on to examine some significant contributions to Marxism. Additionally majors and minors can sign up for GER 211 where significant texts will be read and discussed in German.

205. Nietzsche and the Nietzscheans.

Friedrich Nietzsche continues to be one of the most influential modern philosophers, yet controversy surrounds almost every aspect of his life and work. This course will help students go beyond the controversy in order to consider Nietzsche’s texts discerningly and how he approached the problems of truth, power, and morality. Close examination of his most important writings will be complemented by inquiry into Nietzsche’s effects on twentieth-century philosophy. Other thinkers include Martin Heidegger, Michel Foucault, Sarah Kofman, Jacques Derrida and Giles Deleuze.

206. Freud and Psychoanalysis.

Freud is one of the most influential thinkers of the 20th century. His ground-breaking work on dreams, the Oedipus Complex, and psychoanalytic method have profoundly changed our understanding of the psyche and social interaction. This course provides a basic survey of Freud’s most important and often controversial writings/discoveries within their historical context and with regards to significant criticisms of his work. “Freud: An Introduction” is part of a cluster which includes courses of Marx and Nietzsche (these courses need not be taken in any particular order) Additionally majors and minors can sign up for GER 211 where significant texts will be read and discussed in German.

207. German in Germany.

An intensive program offered in German at all levels in Berlin, Germany, for one month in summer. Instruction by native Germans with University of Rochester faculty member in residence. Includes side trips and excursions in this historic area.

209. Cowboys and Indians.

What makes a Western a Western? Is it cowboys and Indians and vistas of the American West? Is it a Western if tough guy Clint Eastwood stars in a film by an Italian director shot in Spain? Or if a German who had never been to the United States writes about the heroic Indian Winnetou and the film versions of the novels are shot in Eastern Europe? This course will explore the myth of the American West in film and literature, including Westerns from Germany, Asia, and of course, the US. Texts and discussions will be in English.

212. Monsters, Ghosts, and Aliens.

This course focuses on the horror genre as popular entertainment in Germany, England, and the US in the 19th and 20th centuries. Particular attention will be paid to the construction of “others” as monsters in literature and film (Frankenstein, Vampires, Devils, Aliens, etc.). Authors/filmmakers include: Hoffmann, Poe, Shelley, Stoker, Jackson, Rice, Harris, King, Murnau, Jordan, Wise, Siegel, Kubrick, Demme, . This course is part of the Horror in Literature & Film Cluster.

220. Sexuality and Gender: Eighteenth-Century Representations.

This course explores 18th century conceptions/constructions of the body, sexuality, and gender as manifest in medical papers, handbooks, aesthetic essays, and literary works to include Lessing’s Laocoon and Philetas, Fielding’s The Female Husband, Defoe’s Moll Flanders, Cleland’s Fanny Hill, de Sade’s Justine, Goethe’s Gotz von Berlichingen, Kleist’s Holy Cacilia and Puppet Theater, Diderot’s The Nun, Shelley’s Frankenstein. Additional theoretical readings include: Foucault, Kristeva, Butler,
This course explores the weird, dreamlike, eerie, and inexplicable world of Kafka's writings. In Kafka's stories dogs conduct investigations, apes report to academics, men turn into bugs, the Statue of Liberty holds up a sword, and arrests occur without explanation as all expectations and assurances about the 'rules' of existence, thought, and social order come into question. In this course we will read texts such as: The Trial, The Metamorphosis, Amerika, The Castle, Investigations of a Dog, A Report to an Academy, In the Penal Colony, and A Hunger Artist. This course is taught in English.

This course explores the beginnings of the horror and detective genres in the 19th century. Particular attention is devoted to the narrative structure, tropes, and psychological content of the strange tales by Poe and Hoffmann. Theories of horror are also addressed to include discussions by lessing, Todorov, Huet, and Kristeva.

This course will examine literary, artistic, and theoretical representations of gender and sexuality as they have changed in the course of the twentieth century. The focus will be on texts from Western Europe and the US, but we will also consider other perspectives. From the New Women to French Feminists and transnational feminism, from homophile societies to "queer nation" and gay marriage, from Sigmund Freud to Michel Foucault and Judith Butler, we will explore the contested and politically charged debates around gender and sexuality that have shaped our views of identity over the last century.

This course will explore the relationship between film and revolution in West German cinema from 1965 to the present. We will consider cinema's potential as a revolutionary medium, while also focusing on how revolution is thematized and constructed in both fiction and documentary films. The course will engage with issues such as coming to terms with the fascist past, recreating the cinema as a revolutionary artistic form, feminism as a revolutionary perspective, the domestic sphere as a revolutionary space, and the co-optation of the cinema's revolutionary potential through mass consumption.

This course will explore major developments in the East German cinema, including issues such as coming to terms with the fascist past, popular filmmaking and art cinema, cinema as a pedagogical tool, artistic dissent and state censorship, socialist ideologies of gender, and the politics of documentary. Each film will be explored in relation to its socio-historical context, providing students with an overview of East German film and culture.
114. Conversational Italian.
Conversation course designed to help students with some knowledge of Italian grammar develop facility with the spoken language. Emphasis on vocabulary-building. Class time devoted to debate, discussions, and conversations about current topics and aspects of contemporary Italian culture. Themes for discussion both extemporaneous and planned. Students are expected to prepare for the assigned themes in advance. Recommended in conjunction with any Italian course, except for IT 101, for extra oral practice. May be taken twice.

124. Modern and Contemporary Italian Culture.
Italian 124 is open to all students and addresses different aspects of modern and contemporary Italian culture. Topics may include politics, economics, mass media, intellectual life, education, popular culture; as well as the ethnic, economic, and cultural relations between Italy and Eastern Europe, Asia, Africa, the European Community, and the United States. Since the specific topic of the course varies each year and the course is typically taught by a different visiting professor from the University of Siena/Arezzo, Italy, IT 124 may be taken more than once. Language of instruction: English.

151. Intermediate Italian I.
The aim of the course is to reinforce the student’s reading, writing, listening and speaking skills in a meaningful cultural context. This objective is achieved through both a systematic study of the fundamentals of grammar and the analysis of a variety of cultural materials. Topics for study, writing practice, and discussion include literature, history, film, and popular culture.

152. Intermediate Italian II.
Continuation of IT 151.

153. Accelerated Italian (Arezzo).
The course enhances comprehension and communication skills as well as knowledge of Italian grammar. Emphasis is on reading, vocabulary building, and perfecting oral and written skills.

157. Italian in Italy.
An intensive, intermediate level language and culture course taught in the historic city of Padova, Italy. Students live in families and experience four weeks of full immersion in Italian life. Classes meet five times a week in the morning for three hours a day. Cultural excursions to Venice, Verona, Florence, and other cities are an integral part of the program.

159. Roman Structures: Engineering in the Classical World.
This is an introductory course with no prerequisites and not calculus based. It begins with an intensive summer fieldwork in Rome and it consists of a study of Roman engineering focused primarily on civil engineering structures, and also including topics in mechanics, hydraulics, and materials. Modern theories in structural mechanics and strength of materials are used to analyze the practice, the achievements, and the limitations of Roman engineering.

190Q. Italian Regions: Geography to History, Language to Culture.
While exploring the geographical and political configuration of the Italian territory, the course focuses on the Italian regions as discrete entities with their own historical, economic, linguistic, and cultural characteristics and on the multiple aspects of their urban and non-urban civilization. Among the topics of investigation are art, literature, and film; social, economic, and religious life; dialects; high cultural traditions and popular ones. Class taught in English, although students with basic knowledge of Italian have ample opportunity to practice and enhance their linguistic skills.

195Q. Dante’s Divine Comedy I.
The course aims at familiarizing students with one of the most significant texts in Western Culture. Through Dante’s text, students will gain a perspective on the Biblical, Christian, and Classical traditions as well as on the political, literary, philosophical, and theological context of medieval Europe. The course will also provide students with an avenue of investigation on the problems of knowledge, and guide them in developing critical tools and research skills. The first part of the semester will be devoted to the creation of a historical and intellectual frame of reference in which to locate The Divine Comedy. The second part will focus on Inferno and a few cantos of Purgatorio. Lectures and class discussion will be complemented by a weekly recitation session. Students enrolled for the upper level cross listings will be assigned a separate complementary reading list with additional primary and secondary sources.

196Q. Dante’s Divine Comedy II.
Prerequisite: None.
The course approaches The Divine Comedy both as a poetic masterpiece and as an encyclopedia of medieval culture. Through a close textual analysis of selected cantos from Inferno, Purgatorio, and Paradiso, students learn how to approach poetry as a vehicle for thought, an instrument of self-discovery, and a way to understand and affect the world. They also gain a perspective on the Biblical, Christian, and Classical traditions as they intersect with the multiple levels of Dante’s concern ranging from literature to history, from politics to government, from philosophy to theology. Class format includes lectures and discussion. Intensive class participation is encouraged.

208. Advanced Tutorial in Italian.
The course is designed for advanced students. It involves class practice and independent projects.

222. Boccaccio’s Decameron.
The course aims to study the Decameron as a book of love that draws its inspiration from Dante’s story of Paolo and Francesca in the Fifth Canto of Inferno; as a secular text that defies major
conventions of medieval writing; as a social commentary on institutions, social classes, and power structures; as a reflection on the interplay between aesthetics and other medieval cultural codes and traditions such as medicine, law, patristics, economics, ethics, and courtly love. Illustrations, visual interpretations, and potential for theatrical adaptations of the text are included in the discussion.


The course studies the archaeology and architecture of buildings in ancient Italy from the fifth century BC to the fourth century AD, adopting a multidisciplinary approach based on archeological evidence, technical and functional aspects, and historical significance. Classes are taught on location and focus on the most relevant monuments and archeological sites in central and southern Italy, including Rome, Ostia Antica, Pompeii, Herculanum, Baia, and Paestum. The course is divided into three parts: (1) structural design and technical issues related to ancient monuments, (2) monuments of Etruscan Italy and Magna Grecia, and (3) Roman monuments.

228. Italy from Napoleon to the First Republic.

The Italian peninsula has a history that goes back at least 2500 years. But the state of Italy, founded in 1861, is younger than the United States. At the intersection of these two facts lies the main theme of our journey from the Napoleonic invasion of Italy to the approval of the constitution of the Republic of Italy: the difficulty faced by the political leaders of united Italy in getting its citizens to identify with the Italian state. Historical accounts and documents, integrated with a selection of literary, operatic, and cinematic materials, constitute the main sources of information and analysis.

230. Italian Cities and Their Civilization.

The course addresses aspects of the history, literature, art, politics, music, and folklore of a few major Italian cities such as Siena, Florence, Pisa, Rome, Naples, Palermo, Verona, and Venice.

244. Art, Architecture, and Literature in the Age of Dante and Beyond (Arezzo).

When we look at works of art in museums, galleries, and churches we are, in most cases, looking at them out of context. Furthermore, when we look at early Renaissance paintings we do not see them through the eyes of the people who produced them or for whom they were produced. We have to learn to see them as they might have been seen. We can begin to do this by learning how to read and to interpret the complex elements at play beneath the immediate surface by setting the artist, his work, and his public in their social and religious historical contexts, and by exploring the universal unspoken language of signs and symbols used by artists. The course content is based on painted forms, i.e., panels, canvases, and frescos from the Trecento and Quattrocento with an emphasis on Tuscan painting. The selection, as far as possible, takes advantage of the availability of works in churches, museums, and galleries within easy visiting distance of Arezzo.

276. Italy: A Cultural Mosaic.

The course consists of four units taught sequentially by American, Italian, and Israeli professors. It will be coordinated by Professor Donna Logan, Director of the Arezzo Program on location. Classroom instruction will be enhanced by field trips. Requirements; class attendance and participation, final paper/test on mosaic segment.

JAPANESE

NOTE: Many courses above 204 are cross-listed with CLT and/or art and art history, film and media studies, women’s studies, history, religion and classics.

101. Elementary Japanese I.

Credit—6 hours

Designed to help beginners acquire a basic command of Japanese. Speaking and listening are emphasized. The classes will be conducted in English and Japanese, shifting from the former to the latter. In the beginning, students will master the Japanese “hiragana” writing system, which they will use in the rest of the course. Students will learn various sentence and phrase particles, basic word order, basic conjugation, and number systems. As the course progresses, katakana syllabaries and kanji (Chinese characters) will be also introduced. Requirements include regular assignments, quizzes, a final exam and language lab. Video and audio tapes are frequently used.

102. Elementary Japanese II.

Sequel to JPN 101. Lecture and recitation designed to help the students at the (late) beginning level acquire a practical command of modern Japanese in all areas. Six credits: the student must register for both lecture and recitation. Although the main emphasis is still on speaking and listening, the students will have more opportunities for writing than in JPN 101. The classes will be conducted in both Japanese and English. The students will master, among other things, “keigo” (polite language), female vs. male speech style, and “direct” style verbals. Text: “Japanese for Everyone” by Susumu Nagara (Gakken).

151. Intermediate Japanese I.

Credit—6 hours

Sequel to JPN 102. Lecture and recitation designed to help the students at the intermediate level acquire a practical command of modern Japanese in all areas. Although speaking and listening will remain to be the main skills to be worked on, the amount of reading and writing will be significantly increased compared to Japanese 102. The classes will be conducted in Japanese except in the grammar lecture. Requirements include regular assignments, and language lab. Text: Japanese: The Spoken Language Part 2 by E. Jorden and M. Noda (Yale University Press). Video and audio tapes are frequently used.
152. Intermediate Japanese II.
Credit—6 hours
Sequel to JPN 151. Lecture and recitation designed to help the students at the (late) intermediate level acquire a practical command of modern Japanese in all areas. Although speaking and listening will remain the main skills to be worked on, the amount of reading and writing will continue to be increased. The classes will be conducted all in Japanese except in the grammar lecture. Text: “Japanese for Everyone” by Susumu Nagara (Gakken).

This course aims at the improvement of students’ overall proficiency in the Japanese language. Listening and speaking skills will be improved through assignments based upon audio tapes, discussion, and role-playing in Japanese. Reading skills will be improved through reading of various “raw” materials. Class taught in Japanese.

203. Advanced Intermediate Japanese II.
This course aims at further improvement of students’ overall proficiency in the Japanese language. Students will start learning colloquial speech style used heavily among family members and/or close friends through the video program based on a Japanese TV drama. Reading skills will be improved through reading various “raw” materials. Essay assignments will be given to students regularly in order to brush up their writing skills. Requirements include unit quizzes, oral quizzes, a comprehensive final and some other little quizzes such as vocabulary tests. Class taught in Japanese.

204. Advanced Conversational Japanese.
Provides students of JPN 202 level or higher with the opportunity to improve their speaking skills. Class activities include discussion of current issues and oral drills. The class will be conducted in Japanese, and is not intended for students who have already acquired near-native fluency.

210. Traditional Japanese Culture.
An overview of Japan’s traditional culture through the most prominent examples of its visual, literary, and performing arts, with attention to the social contexts of aesthetic experience and to ideas of a “national culture.” Taught in English, additional work available in Japanese where appropriate.

219. Manga and Anime.
An exploration of Japanese popular culture as portrayed by the cartoon culture of manga (graphic novels) and anime (Japanese animation). Material ranges from the origins of print and moving picture cartoon culture in the early twentieth century to the present. Issues addressed include national identity, global consumption, and genre cross fertilization, providing an opportunity to explore how Japanese culture informs these now widely popular forms of popular entertainment.

219A. Tourist Japan.
Japan’s image as a foreign destination, focusing on 1900-1970: Japan defining itself and being defined by others through visual and material culture; the value of material culture in historical practice and theory.

This course examines the spectacular urban culture of the Edo period against the background of new economic, political, and legal developments. Of special interest is the world of theaters and entertainment quarters that both reflected and supported the art and literature created by new constellations of social groups.

An introduction to the Chinese and Japanese writing systems, including their historical development, artistic practices, and practical applications. One meeting per week will be devoted to the study of calligraphy. Ideal for those studying Chinese or Japanese, but experience in the languages, while helpful, is not required.

233. The Culture of Zen.
Zen Buddhism was the core around which many of Japan’s greatest cultural achievements evolved. From the medieval period on, with its importation from China, the culture of Zen served as the primary context for much of Japanese metaphysics, architecture, landscape and interior design, medicine, ink painting, noh drama, haiku poetry, as well as the entire cultural complex known as the tea ceremony. Along with the Zen doctrinal and textual roots of these remarkable achievements, this course will examine the vibrant culture fostered in the medieval Zen monastic temple institution known as the Gozan and its dispersal into the culture at large.

234. Haiku Poetry.
Haiku poetry and its related art form, haiga ink-painting, were among the most important of the poetic and artistic genres of early-modern (1600-1900) Japan. This course studies the works of the great haiku masters Basho, Buson, Issa, and Shiki.

246. Issues in Contemporary Culture.
This seminar course is based on research and discussion of a variety of issues of contemporary concern in Japan, including national, ethnic and racial identity; changing gender and sex roles; the family and generational conflict; immigration and work; the emperor system, war, and memory; cultural authenticity; and Japan’s changing roles in Asia and in the world. Readings on issues begin with articles in the online English-language editions of Japan’s main news media, extend outward to reports in the US news media, and eventually to popular and scholarly English-language studies of the issues involved. Grading is based on participation in informed discussion of issues raised in class (20%), and on four papers on issues to be chosen by each student with the instructors permission (20% each).
255. Novels of Murakami Haruki.

261. Kyoto.  
Credit—2 hours.  
This course examines the various forces that shaped Kyoto from the point of view of history, urban studies, religion, and art.

262. Tokyo.  
Credit—2 hours.  
This course examines the various forces that shaped Tokyo from the point of view of history, urban studies, religion, and art.

A critical and historical introduction to Japanese women writers: the socio-historical, cultural, and ideological context for and emergence of a literary tradition.

Japanese cinema from its origins to the 1960s: genre, narrative, diversity of style, theory, and technology; the visual image in a social, cultural and historical context.

284. Mobsters, Monsters, and Swords.  

The films of Akira Kurosawa, his co-workers, and the contemporary issues and aesthetic influences important to his career.


287. Nagisa Oshima.  
The works of Nagisa Oshima: Shochiku, the Japanese New Wave, independent cinema, and beyond.

288. Director Yasujiro Ozu.  
The myth and historical reality of Yasujiro Ozu (1923-1963), the “home drama” genre, and 20th c. Japanese culture and society.

290. Women in Japanese Film.  
Explores the representation of women in contemporary Japanese film. Begins with a sample of the prototype heroines (predominant in the films of Mizoguchi, Naruse, Ozu) who set the standard for what some Japanese critics describe as a “special Japanese brand of feminism,” which they call “the worship of womanhood.” Also examines genres based on gender-role archetypes and adaptations of women’s literature.

Anime as film form and cultural phenomenon. Content varies, from a survey of anime genres to the world views and visual style of specific directors; emphasis on anime as hybrid popular culture both local and global.

393. Senior Essay.  
A paper based upon independent study; required of concentrators.

POLISH

101. Elementary Polish I.  
Introduction to modern Polish and basic vocabulary.

102. Elementary Polish II.  
Continuation of POL 101.

151. Intermediate Polish.  
Designed for students returning from a semester in Poland and or have completed Pol 101 and 102. Uses intermediate/advanced book W Labiryncie, adapted Polish soap-opera. Reading and learning dialogues, review of grammar and stress on contemporary active language. Students will view feature films in Polish and write/correct a composition on the films in Polish.

RUSSIAN

101. Elementary Russian I.  
Introduction to Russian grammar, phonetics, and conversation. Emphasis on practical Russian language skills. Lectures combine drills in Russian with presentations in English. Recitations are conducted primarily in Russian.

102. Elementary Russian II.  
Continuing introduction to Russian grammar, phonetics, conversation. Emphasis on practical Russian language skills. Lectures combine drilling in Russian with presentations in English. Recitations are conducted primarily in Russian.

114. Russian Conversation.  
Students cover various topics aimed at improving conversational skills in everyday situations.

123. Russian Life.  
The culture and history of everyday life in Russia.
124. Background in Russian Studies.
Taught by a native speaker of Russian, this course is intended for those with a minimum of one year of college-level Russian. It is structured around Russian film and TV broadcasts and other authentic Russian-language materials. It offers students the chance to improve their comprehension and speaking skills. Those taking the course for 4 credits also work on additional written assignments in consultation with the instructor. Class taught in English.

126. Russia Now.
In this expanded 4-credit version of the 2-credit “Russia Now” course, students will follow current events in Russia through print and electronic sources, and write two short essays and one longer research paper.

127. Russia Now.
Credit—2 hours
Students will follow current events in Russia through the internet, newspapers, magazines, and other sources (including satellite broadcasts when available). Along with a general attention to current events, each student will follow a particular area of interest (e.g. national identity, the market economy, politics, health issues, crime, culture, foreign policy) throughout the term, do background work on this topic and write it up towards the end of the term. Students who read Russian will be encouraged to use available sources in that language. This course is designed to (1) familiarize students with the most important issues facing Russia today and the historical/political/cultural context in which to place them; (2) to acquaint students with a variety of resources from the US, Russia, and a number of other countries and the different perspectives these sources may give on one and the same issue. May be taken more than once for credit.

128. Russian Civilization.
Russian Civilization from its beginnings a thousand years ago to the present day. Each unit will cover historical and cultural background as well as literary texts. We will examine important national “myths” (narratives with a variable connection to the historical record) that govern the Russians’ understanding of their history and culture, including: the Golden Age of Kiev, Moscow as the Third Rome, and the myths surrounding the city of Petersburg. We will analyze traditional tensions in Russian civilization which prevail today, such as those between: chaos and order, foreign influence and a strong national identity, innovation and tradition, and between radical skepticism and faith. Readings will include: Russian fairy tales and saints' lives, excerpts from the autobiography of the 17th century heretic Avvakum, tales by Pushkin and Gogol, one of Dostoevsky’s most powerful and influential novels (The Devils/Possessed), and a wide range of materials from the twentieth century. In English.

129. Russian Culture.
A series of lectures, films, excursions, and field trips designed to acquaint students with contemporary Russian culture and political issues. Held in St. Petersburg.

151. Intermediate Russian I.
Further development of grammatical concepts introduced in elementary Russian; building of vocabulary and comprehension skills; weekly film essays. One recitation per week.

152. Intermediate Russian II.
Continuation of RUS 151 with further development of grammatical concepts; building of vocabulary and comprehension skills; weekly film essays. One recitation per week.

157. Russian in Russia.
Russian language and culture in St. Petersburg, Russia, in the month of June. Coursework in grammar, phonetics, conversation, reading, and culture, all oriented toward practical language skills. Lodging and meals with host families, and excursions in and around St. Petersburg, including a weekend trip to Moscow.

190Q. Tolstoy’s War and Peace.
A semester-long exploration of the world of War and Peace. The class works its way through the novel (in English) over the term, while looking at materials that help “unpack” it, including historical accounts of the same events and attempts by Russian, English, and American directors to capture the essence of the novel on film.

200. Advanced Russian I.
Extensive reading of Russian prose with oral discussion and written compositions. Study of advanced Russian grammar topics.

Extensive reading of a variety of texts in Russian. Focus on difficult grammatical constructions, building reading vocabulary, and writing short essays in Russian. Class conducted primarily in Russian.

207. Advanced Russian in Russia.
Advanced Russian language and culture in St. Petersburg, Russia, in the month of June. Coursework in grammar, phonetics, conversation, reading, and culture, all oriented toward practical language skills. Lodging and meals with host families, and excursions in and around St. Petersburg, including a weekend trip to Moscow.

209. Advanced Topics in Russian Grammar.
Various topics in grammar and syntax at the advanced level with an emphasis on practical applications. Students will view six widely acclaimed films, which will form the basis for the acquisition of written skills, grammatical accuracy and conversational fluency.

212. Advanced Literature and Culture Original I.
Reading, composition and conversation for advanced students and heritage speakers of Russian.
215. Advanced Literature and Culture Original II.
A continuation of RUS 212. Prior enrollment in RUS 212 is not required.

218. Advanced Literature and Culture Original III.
This course is a continuation of RUS 212 and 215. Prior enrollment in RUS 212 and 215 is not required.

222. Russian Drama.
Introduces the Russian theater in its cultural and political context, with close readings of plays from the late 18th century to the late 20th century by Catherine II, Griboedov, Gogol, Ostrovsky, Tolstoy, Chekhov, Kharms, Bulgakov, and others. In English.

231. Great Russian Writers.
A survey of nineteenth century Russian literature from the end of romanticism through the rise of realism and the advent of modernism. We read Pushkin's *Eugene Onegin*, Lermontov's *Hero of Our Time*, Gogol's *Dead Souls*, Tolstoy's *Anna Karenina*, and two plays by the forerunner of modern theater, Anton Chekhov. In English.

237. Dostoevsky.
We unpack the writer's life and art through close readings of his major works, including *Poor Folk*, *Letters from the House of the Dead*, *Notes from Underground*, *Crime and Punishment*, and *The Brothers Karamazov*. In English.

243. Chekhov and His Contemporaries.
The climax of Russian civic, lyric, and psychological realism in the works of Chekhov, Tolstoy, Bunin, Gorky, and others. Symbolism as a reaction to realism and as the beginning of literary modernism in Russia.

244. Image of Christ.
Jesus Christ has dominated Russian art and culture for a thousand years. We will contrast the Jesus of history with the Christ of faith, compare Gospel accounts, analyze icons and saints lives and then focus on important novels of the 19th and 20th centuries by Tolstoy, Dostoevsky, Mikhail Bulgakov and Boris Pasternak that address the image of Christ. In English.

246. Image of Christ in Russian Literature.
The image of Christ has dominated Russian art and culture for a thousand years. Indeed, it may even be argued that Russian literature began with Jesus Christ, for in its earliest forms—the numerous accounts written of saints' lives—it dealt with little else than living in accordance with the words and deeds of Christ. After briefly setting the context, the course focuses on the nineteenth and twentieth centuries, exploring the extraordinary range of poetic encounters with the figure of Jesus in works by Tolstoy, Dostoevsky, Aleksandr Blok, Anna Akhmatova, Mikhail Bulgakov, Boris Pasternak, and Venedikt Erofeev.

247. Secret Nation.
The cult and culture of secrecy in Russia from Ivan the Terrible to the present. Russia was always an enigma, as tsarist and Soviet governments gathered and controlled information. The Russian people kept information from the government, and foreign states sent out disinformation of their own about Russia. There was an active underground in religion, literature, politics, the economy, and other areas. With glasnost, Gorbachev began the process of uncovering secrets from above, and a freer press began to do the same from below. We use materials from history, religion, literature, film, political science, and economics, to get a richly detailed picture of the information that was hidden, and the means by which this was accomplished. Official secrecy that was originally a defensive move came to undermine the state it sought to protect. At the end of the semester we see to what extent old habits of secrecy persists in Russia today. The course is taught in English.

This course examines how culture, ethnicity, and politics intersect in 20th-century Russian literature. We begin with excerpts from Dostoevsky's *Diary of a Writer*, sacralizing Russianness and demonizing Jews. Political and artistic avant-gardes 1900-1930 are analyzed for their attempts to overcome traditional ethnic divisions. In Stalin's Russia an international Soviet identity was replaced by a Russian state culture, which put "cosmopolitanism" on trial after World War II. A secular Russian cultural identity was the norm until the state withdrew from the cultural sphere in the late 1980s, but Russian Jewish emigre literature was available to many readers through unofficial channels. We end with the battle of competing identities in post-1985 Russia. Readings include: Dostoevsky, Babel, Grossman, Mandelstam, Pasternak, Roziner, Tertz, Markish, Rasputin, and Brodsky. In English.

250. Topics in Twentieth-Century Russian Literature.
Undergraduate seminar.

264. Russian Literature Outside of Russia.
Some of the greatest literature by Russian writers of the twentieth century was written outside of Russia, sometimes not even in Russian. It was written by writers who fled abroad after the October Revolution in Russia in 1917 or who were later expelled by the Soviet authorities. This literature—banned in the Soviet Union until a few years before its collapse —constitutes a unique body of fiction that exists on the border between two cultures: that of the writers' abandoned Russian homeland and that of their adopted home country. This course provides a survey of the most prominent authors and works of this literature in exile.

265. Russian Literature Between the Revolutions.
A survey of emblematic stories and novels of the Soviet period, including works describing the first decade of the new regime, a Socialist Realist classic of the 1930s, literary tributes to Stalin, a manuscript that "would not burn" and important post-Stalin works that anticipate the literary renewal of the immediate post-Stalin period. In English.
267. Russia Goes to the Movies.

The dawn of the age of movies coincided with the Russian Revolution, and film was Lenin’s favorite art form. The course surveys Russian film from the beginnings to the present. The course investigates the major role that cinema played in shaping the national and political identity of the Soviet Union, and looks at what was artistically interesting and popular about these films, some of whose directors, like Eisenstein and Tarkovsky, are among the world’s most influential filmmakers.

289. Dangerous Texts.

When modern Russian literature began to evolve in the mid-1600s, the printed or written text was immediately seen as a potential danger to the power of Church and State. In this course we will examine dangerous texts’ from the 17th century to the present to see what aspects of texts and their authors were seen as threats and how these threats were dealt with. We will also see the ways in which writers did indeed perceive themselves as a second government’ and how this changed the way they wrote. The reading list will include works by: Avvakum, Radishchev, Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, Babel, Mayakovsky, Mandelstam, Pasternak, Yevtushenko, Solyanitsyn, Voinovich, Grossman, and Sinyavsky/Tertz. The goal of this course is to arrive at an understanding of the unique role played by literature in Russian history. In English.

391. Independent Study.

393. Senior Essay.

A paper based upon independent study; required of concentrators.

SPANISH

NOTE: SP 202, 203, and 204 are offered in this order in successive semesters. SP 200 is a prerequisite to all courses.

101. Elementary Spanish I.

Intended for students with no background in Spanish, or whose background does not make placement in a higher-level Spanish course advisable. Training in speaking, comprehension, reading and writing through classroom instruction and recitation periods. Students must also register for the associated recitation section. Two or three exams; daily assignments.

102. Elementary Spanish II.

Spanish 102 continues the work of the beginning course Spanish 101. There is added emphasis on reading comprehension, vocabulary building and culture. Students must also register for the associated recitation session. Two or three exams; daily assignments.

151. Intermediate Spanish I.

Continuing study of modern Spanish in its spoken and written forms. Emphasis is given to cultural and literary readings and discussions, as well as composition-writing skills and Multimedia Center activities. Two exams; several compositions and rewrites.

152. Intermediate Spanish II.

Continuation of SP 151. Intended to advance conversational skills and refine writing skills through cultural and literary readings, discussions, and Multimedia Center assignments. Two exams; several compositions and rewrites.

157. Spanish in Mexico.

Study Spanish conversation and culture abroad in a Spanish-speaking country (Ecuador, Mexico, or Spain). Program fee includes instruction at local language institute, family-stay and partial board, and excursions designed to complement the program’s special topic. Special application required.

200. Advanced Spanish Composition.

This course is designed to refine the student’s writing and reading skills in Spanish in preparation for entering upper-level Spanish courses. The class time and the assignments are divided between developing composition-writing skills, a variety of readings in Hispanic literature, and some review of grammatical structures. Two exams; four or five compositions and rewrites. Class taught in Spanish.


Introduction to the analysis and interpretation of 19th, 20th and 21st century Spanish literature, including representative works of fiction, drama, and poetry. Course conducted in Spanish and all assignments written in Spanish. Focus on literary texts, their social contexts, and the rise of modern Spain as represented by a variety of writers. Several papers and midterm exam.

203. Early Hispanic Texts.

The course features early-modern Hispanic texts of Spain and Spanish America. It concentrates on the literature of the 16th and 17th centuries with works such as the Lazarillo de Tormes, the Novelas ejemplares of Cervantes and the poetry of Sor Juana Ines de la Cruz. Several papers in Spanish required. Class taught in Spanish.


The course provides a representative survey of Spanish-American literature from Independence (19th century) to the present within a cultural-historical framework. Works studied include poetry, prose fiction, and theater. Emphasis on textual analysis, with attention to diverse traditions and cultures of Spanish America. Several short papers; two exams. Class taught in Spanish.

205. Spanish Culture.

This course explores the history of social and cultural development of modern Spain into the 21st century through a variety
of media such as art, literature, and film. Topics range from the early cultural life of the peninsula to the implications of the Reconquista and from Spain’s overseas empire to the Spanish Civil War, some emphasis on contemporary issues. Class taught in Spanish. Several papers, midterm exam. All written work in Spanish.

206. Spanish-American Cultures.

This course explores the ideas and events shaping the culture(s) of Spanish America, from pre-Columbian times to the present, with an emphasis on the concepts of discovery, conquest, mestizaje, and the formation of national cultural identity. Strong consideration will be given to contemporary issues. Texts will be drawn from literature, sociology, anthropology, history, the arts, and film. Several short essays, two exams. Class taught in Spanish.

207. Spanish in Summer Study Abroad.

Study Spanish conversation and culture abroad in a Spanish-speaking country (Ecuador, Mexico, or Spain). Program fee includes instruction at local language institute, family-stay and partial board, and excursions designed to complement the program’s special topic. Special application required.


This course entails a close reading of the novel in English translation, coupled with a focus on the ways in which both the novel and/or protagonist have been adapted, adopted, interpreted or incorporated by various critical and popular traditions both inside and outside of Spain from the time of its original publication in 1605 through the 21st century. We will examine several filmic adaptations, illustrations and paintings as well, with an eye toward critically examining the problematic employment of Don Quixote as an icon of Pan-Hispanic culture. However, we will continually return to the novel as our anchor throughout the course, while assessing the constantly changing ways in which contemporary readers and scholars approach the text. Course is taught in English. Students taking the course for Spanish credit will do the bulk of the work in Spanish.

216. The Picaresque Novel.

Conducted in English, with readings in the original language or in English, the course investigates the Lazarillo de Tormes, Mateo Aleman’s Guzman de Alfarache, Quevedo’s Bascon, Grimmelshausen’s Simplicissimus, Defoe’s Moll Flanders, Smollett’s Roderick Random, Le Sage’s Gil Blas, and Thomas Mann’s Felix Krull in an attempt to determine whether there is a picaresque genre and to explore the dialectic between morality and criminality in the growth of the early European novel.

217. El Quijote.

A close reading of both parts of the novel, with special attention to how the Spanish work anticipates and prepares the major modes of expression of later Western prose fiction. Each student will be asked to interpret a major 18th, 19th, or 20th-century fiction on the basis of Cervantes’s book. Classroom presentations, written assignments, and exams. Class taught in Spanish.

220. Golden Age Drama.

A study of the theatrical masterpieces of Lope, Tirso, and Calderon, which rank with the greatest Western drama, with particular attention to their comedic uniqueness. Class taught in Spanish.

231. The Generation of 1898 and Modernismo.

In both Spain and Latin America the closing years of the nineteenth century and the dawning of the twentieth demanded critical revisions in the areas of politics and aesthetics. Intellectuals—writers, artists, and musicians alike—confronted the “ruins” of the past, seeking in their place new expressions of sublime beauty, liberty, spirituality and sensuality. Revision or destruction? Tradition or innovation? Nationalism or “Enlightenment”? Woman as angel or demon, muse or serpent? From Nicaraguan Ruben Dario to Cuban Jose Marti, and in Spain, from Valle-Inclan to Unamuno, this course explores the creation of the ‘fin de siglo’ subjectivity in its multiple forms during the “decadent” transition from the “old” to the “new.” Class taught in Spanish.

245. Twentieth- and Twenty-First Century Spanish Theater.

Explores trends in Spanish theater from the early twentieth century (Valle-Inclan, Garcia Lorca, Benavente) through post-Civil War censorship and ‘posibilismo’ to 21st century productions. Plays by Casona, Buero, Sastre, Arrabal, and Ruibal to the most recent innovators (Ana Diosdado, Antonio Gala, Francisco Nieva, Paloma Pedrero, etc. are included). We will also consider cinematic versions of plays to compare technique and forms of representation. Several papers. Class taught in Spanish.

249. Bunuel, Dali, Lorca.

Topics vary and may include the Spanish sonnet and romance, Cervantes’ novels exemplars, the arts and the Spanish Civil War, and other considerations of the relations between literature and other disciplines (the visual arts, philosophy, history, music, etc.). Class taught in Spanish.

249A. Stories from Spain.

This course examines a variety of realist novels, psychological thrillers, erotic tales, heroic narratives, and coming-of-age tales from XIX, XX and XXI century Spain. In discussions we will look at social changes—the Spanish Civil War, the death of Franco, the Constitution of 1978, women’s rights movements—autonomous regional politics, the destape, the Movida, and Spain in the New Europe—through the literary reflections of social issues, aesthetics, and political debates. Course taught in Spanish. All written work in Spanish.

249B. Stages of Resistance.

This course studies the role of Spanish theater as a vehicle for the examination and critique of Spanish society in different stages of its history. Although the main focus of the class will
be dramatic texts (la comedia, el auto sacramental, el entremes) from Spain’s Golden Age, we will also examine representative examples of contemporary Spanish theater. We will discuss the role of the dramatic stage as a space for continually questioning and commenting on, among others, the construction of gender roles, politics, religion, sexuality and Spanish national identity. Some of the themes examined will be cross-dressing, the connection between “Church” and “State”, censorship (by the Inquisition and the Franco regime) and theater post-Franco. Students will be exposed to basic theory on performance and to theatrical terminology. Authors will include: Félix Lope de Vega, Pedro Calderón de la Barca, Federico García Lorca and Paloma Pedrero. Class taught in Spanish.

249D. Bunuel, Dalí, Lorca.
This course explores Surrealism and Spain, from the 1920s on, embedding cutting-edge works in broader questions of identity and possible threats to an emerging nation in a continent, a world, and an ethos caught between tradition and modernity. Includes films, art, essays, plays, poetry. Course taught in Spanish.

256. Contemporary Spanish-American Prose.
Spanish-American fiction attained a new level of international recognition and a greatly expanded readership with the emergence of the “new narrative” and the so-called “Boom” of the 1960s. This course covers modern classics by authors such as Jorge Luis Borges, Alejo Carpentier, Juan Rulfo, Gabriel García Marquez, Elena Garro, Mario Vargas Llosa, Carlos Fuentes, Luisa Valenzuela, Manuel Puig. Our study of major novels and short stories explores the works within their literary, cultural and social contexts. Several brief textual commentaries, two essays, two exams. Class taught in Spanish.

Spanish America has long been home to internationally renowned poets, while theater has seemed to languish in the background. This course juxtaposes the often private, hermetic language of poetry with the public genre of theater to discover aesthetic and ideological connections and disparities. Readings chosen from the major works of Alfonsina Storni, Roberto Arlt, Pablo Neruda, César Vallejo, Jorge Díaz, Luis Rafael Sánchez, Octavio Paz, Sabina Berman and others. Several brief textual commentaries, two essays, two exams. Class taught in Spanish.

The study of texts written by women from Spanish America raises broad questions concerning representations of sexuality and gender, the gendered uses of language and literary conventions, aesthetics, psychology, and social issues. Materials from a variety of fields (literary and cultural theory, history, sociology, anthropology, feminist studies) are brought to bear on the primary texts by authors including María Luisa Bombal, Rosario Castellanos, Rosario Ferré, Elena Poniatowska, Luisa Valenzuela, Diamela Eltit, Carmen Boullosa, Isabel Allende. Campus visit by one of the authors or a literary translator planned. Reading response papers, two essays, research term paper. Class taught in English.

The 20th century’s major periods of social and political upheaval in Spanish America are well documented by written and visual texts that claim to tell the truth about historical events. Many of these texts acquire the status of “literature” and not mere “reporting.” This course examines the conventions of the literatures of fact, the expectations that readers bring to documentary writing, the blurring of the lines between factual and fictional discourses. Autobiography, “testimonio,” chronicle, documentary poetry and documentary film represent revolutionary Mexico, labor struggles of the 1920s, revolutionary Cuba, the repression in the Southern Cone, the Central American insurgencies, and the survival of indigenous cultures. Short essays; research term paper. Class taught in English.

262. Topics in Spanish-American Literature.
Topics vary from semester to semester. Possible topics include the confessional mode in Hispanic literature, surrealism and the avant-garde in art and Hispanic literature, Mexican literature, and other areas of interdisciplinary study. Class taught in Spanish.

262B. Cuba XXI: the Utopian Island.
Now that the twenty-first century has arrived, we cannot help but picture a Cuba “without Fidel.” But what does that mean? How do those in Cuba imagine their nation down the road? How does the Cuban community in Miami represent its hopes and dreams? This course examines art, film, and literary texts from the “homeland” and from the diaspora to compare and contrast images that negotiate between the past and the future. Course taught in English. Readings may be done in English or Spanish (for SP credit).

262D. Culture and Literature of the Caribbean.
This course focuses on the Spanish-speaking Caribbean within the larger cultural, historical, and political context of the Caribbean Basin. The course examines indigenous, European, and African influences on the molding of national cultures and identities as found in literary, cultural, and theoretical texts. Readings include examples from modern and contemporary Cuba, Puerto Rico, the Dominican Republic and Yucatan. Writings of Nicolás Guillén, Eugenio María de Hostos, José Martí, Roberto Fernandez Retamar, Ana Lydia Vega, and writers and artists of the Caribbean diaspora. Class taught in Spanish.

262F. Identity Signs: Spanish-American Coming of Age Stories.
This course examines 20th-Century Spanish-American literary texts that represent the young person’s search for identity, self-knowledge and a place in an often hostile society. Factors such as nationality, social class, gender, race, ethnicity, disability and sexual orientation make this a dynamic process that is fraught with tensions and contradictions. Authors may include: Teresa
de la Parra, María Luisa Bombal, José María Arguedas, Mario Vargas Llosa, Rosario Ferré, Isabel Allende, Elena Poniatowska, Reinaldo Arenas. Short essays, research term paper. Class taught in Spanish.

262G. Colonial Latin American Literature.
This course surveys the major texts in Latin America’s colonial period, including the writing of Christopher Columbus, Hernán Cortés, Bartolomé de las Casas, El Inca Garcilaso de la Vega, Álvar Nuñez Cabeza de Vaca and Sor Juana Inés de la Cruz. We will explore the literary and historical aspects of these texts and consider, among other, the themes of empire, gender, race, and class. Class taught in English but may be taken for Spanish credit.

282. U.S. Latinos/Latinas.
Introduction to U.S. Latino/a writing and culture in its rich geographic and ethnic diversity; Latinization of the American landscape; exile, immigration, cultural syncretism.

287. Latin American Film.
From the very first encounters, the Americas excited in the outsiders’ imagination a host of mythical and legendary images. While the first such crisis of representation occurred in other forms and texts, in the twentieth century the cinema has been the medium of cultural encounter and resistance. This course examines a variety of films produced by and about Latin America, its history and inhabitants. Questions of self-representation, cultural boundaries, gender identities, and the image of the nation are explored, as are issues of commercial cinema versus the art film. Topics vary from semester to semester. Class taught in English. Written work in Spanish for Spanish credit.

287A. Mexican Film.
This course explores both historical antecedents and contemporary visions. It includes films by directors such as Spanish exile Luis Bunuel, Alejandro Gonzalez Inarritu, Jaime Humberto Hermosillo, Alfonso Cuaron, Carlos Reygadas, Raul Ruiz, Maria Novaro, and other box office favorites. From Robert Rodriguez’s Bedhead, to Desperado, Once Upon a Time in Mexico, and, of course, Y tu mama tambien, Entre Pancho Villa y una mujer desnuda, and La ley de Herodes we explore images of Mexican culture. Course taught in English but work may be written in Spanish for Spanish credit.

288. Spanish Film.
Devoted to the critical analysis of recent Spanish cinema within its cultural contexts. Beginning with the early post-Civil War period, the focus is on film as the narrative representation of radical changes and transitions in Spanish society. Considers the translation of other media (literary, theatrical, etc.) into film and the problematic relationship between historical “reality” and the aesthetics of cinematic representation. Emphasis on films from the democratic transition to today. Includes films by directors such as Buñuel, Erice, Saura, Trueba, García Sanchez, Almodóvar, de la Iglesia, Amenabar. Class taught in English. Written work in Spanish for Spanish credit.

289. Women in Hispanic Film.
Examine images of women in a variety of films from Latin America and Spain. Topics range from the use of “the feminine” in war propaganda, to films of the Franco dictatorship, and from Latin American political documentaries to popular commercial films. Emphasis on cinematic representation as visual ideology, and on films at the millennium. Class taught in English. Written work in Spanish for SP credit.
Music

Paul Burgett, PhD (Eastman)
Adjunct Professor of Music

John Covach, PhD (Michigan)
Professor of Music and Chair of the Department; Professor of Theory, Eastman School of Music

David Harman, DMA (Eastman)
Professor of Music; Director of Orchestral Activities

Honey Meconi, PhD (Harvard)
Susan B. Anthony Professor of Gender and Women's Studies, Professor of Music, and Professor of Musicology, Eastman School of Music

Kim Kowalke, PhD (Yale)
Professor of Music; The Richard L. Turner Professor in Humanities, Eastman School of Music

Zora Mihailovich
Professor of Music, Artist in Residence, and Visiting Adjunct Professor, Eastman School of Music

Matthew BaileyShea, PhD (Yale)
Associate Professor of Music

Jennifer Kyker, PhD (Pennsylvania)
Assistant Professor of Music

Bruce Frank, DMA (Eastman)
Lecturer

Jason Titus, PhD (Eastman)
Lecturer

The Department of Music offers courses of study leading to the BA degree, a minor, and seven clusters in music. A wide variety of nontechnical courses addresses nonmajors 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 (ESM), normally open to any student presenting the proper prerequisites, augment the range and depth of musical experiences and courses available to students in the College. (For information concerning the Bachelor of Music degree and courses offered at Eastman, consult the Eastman School’s official bulletin.)

Musical Ensembles at the River Campus

The music major requires four semesters of participation in one or more faculty-directed ensembles sponsored by the College music department: Men’s Glee Club, Women’s Glee Club, Chamber Singers, Gospel Choir, Jazz Ensemble, Wind Symphony, Chamber Orchestra, Symphony Orchestra, Gamelan. Candidates are encouraged to participate in one or more ensembles beyond the minimum requirement, although no more than 4 credits can be applied toward the major. Nonmajors can also participate in Chamber Ensembles, Rock Repertory Ensemble, Brass Choir, Mbira and Percussion Ensemble, but it will not count toward fulfillment of the ensemble requirement.

In addition, there are a number of student-organized musical groups.

Private Instrumental and Vocal Instruction

Credit Lessons

Any full-time, matriculated student may audition for lessons at the Eastman School of Music. Minimum standards of proficiency are established by the various Eastman departments; students demonstrating those standards may take lessons for collegiate credit. The Department of Music’s performance manager provides the required audition application on request.

Most students meet with their instructors once a week for a 30-minute lesson, receiving 2 credits. 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. No more than 16 credit hours may be counted toward the BA degree.

Noncredit Lessons

Students may take lessons without credit by enrolling directly in the Eastman Community Music School (ECMS). 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 students’ permanent record at the University. However, ECMS awards grades for all study, and a transcript of such study is available through ECMS.

Practice Facilities

Practice facilities on the River Campus are open to members of the University community. Keys are available in the music department office.

The Department of Music in the College offers the Bachelor of Arts degree. 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 major 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 tracks within the major (basic, composition, history/theory, music in world cultures, musical theater, performance, and popular music/jazz) and excellent preparation for study at the graduate or professional level.

Although the major in music is a demanding one, students often explore, beyond the introductory level, one or more nonmusic disciplines as well. Some students pursue a double major.

Students who major in music in the BA program at the University of Rochester usually demonstrate significant prior
musical experience. Applicants to the College who are considering a major in music are encouraged to submit a recorded audition 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; pianists can often audition in Rochester and should contact the department office to schedule an audition. Students are admitted to the music major by the music faculty after a review, usually in the sophomore year, of their academic records and musical progress.

BA in Music

A major in music comprises 63–73 credits, depending upon background, precollege preparation, and the particular track selected. All music majors are required to take the core courses as listed below. Requirements for ensemble, private instruction, and electives vary with the track.

The core courses include:

- Music theory (16 credits): MUR 111, 112, 211, 212.
- Musicianship (3 credits): MUR 109 (if needed), 113, 114, 115.
- Music history (20 credits): MUR 221, 222, 223, 224.
- Ensembles (four semesters in a faculty-directed ensemble sponsored by the College music department).
- Private studio instruction (four semesters): Upon presenting a successful audition, full-time matriculated students are assigned studio instruction at the discretion of the dean of academic affairs at Eastman.
- Keyboard skills (4 credits): Students must demonstrate keyboard facility prior to graduation either by successfully completing MUR 116 and 117 or by passing the equivalent proficiency test for each course.
- Music electives (8 credits): Credits may be chosen from any MUR course numbered 120 or higher and/or ESM course numbered 200 or higher, except ESM’s MHS 421–426. Unless stated otherwise in the requirements for the track, no ensemble or 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 20 courses or the equivalent number of credit hours from a single department may be applied toward the degree. Although the requirements for the major in music can be met in three years, students considering a music major are urged to begin the music theory sequence in the fall semester of their first year. Students with limited background in music who do not qualify for Theory I should enroll in MUR 110, Introduction to Music Theory, during their first year.

Honors in Music

Information about the honors program is available from the department office.

Minor in Music

A total of 28 credit hours are required, with 12 of those credits specifically designated: MUR 111, 112, and 134. The remaining 16 credits are to be chosen from MUR courses numbered 109, 113 or higher and/or ESM courses numbered 200 or higher. No more than 8 credits can be derived from studio instruction and ensembles combined.

Upper-Level Writing Requirement

The College’s discipline-based writing requirement will be satisfied by successful completion of the music history sequence (MUR 221–224), which offers ample opportunity for various modes of written discourse.

BA/MA Programs

BA/MA Program in Music Education with Teaching Certification

The College music department and the Eastman School’s music education department offer an option allowing a limited number of undergraduates to get an early start on a Master of Arts degree in music education at Eastman. The program normally takes five and one-half to six years to complete. Along with the master’s degree, students also receive initial certification for teaching music in the New York State public school system. Students interested in the program should consult Josef Hanson in their first year at the University, since a detailed program of study needs to be carried out. Students apply for the MA degree during the second semester of their junior year. Details are available from the music education department at the Eastman School, (585) 274-1540.

3+2 BA/MA Program in Ethnomusicology

Students must complete required theory, history, musicianship and keyboard skills, and performance requirements (studio instruction and ensembles) of one BA music track; must include a World Music (MUR 121 or 6MHS 281 or 282 [ESM]) course. Students must maintain a minimum 3.0 GPA in required courses. An entrance audition/interview at ESM is required as part of admission to the MA.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

100. Experiencing Music.

A “music appreciation” course that celebrates the “ears-on” experience of various aspects of musical performance. Participants develop listening skills through live musical presentations, in-class performances, discussions with the performers and living composers, and guided listening sessions. Students will attend some rehearsals and concerts, including at least one Rochester Philharmonic concert at the Eastman Theatre.
A course for the student with no previous musical experience. Topics covered include notation, intervals, chords, and other basic concepts of tonal harmony, with application to the study of a wide range of styles including popular idioms. Students should not be able to read music. Prerequisite for MUR 111.

103. Musical Adventures.
Explores the wonderful world of music from Bach to Coolio. Exploring questions such as, “What is music?” and “Why humans make it?” We’ll find out what one another of us thinks is musically “mint” and musically “gross” and why. From concert halls to church halls; beer halls to dance halls, we’ll go in search of music.

Credit—1 hour
Introduces students to basic musicianship skills. Begins with exercises in pitch matching and basic interval recognition and progresses toward other skills, such as singing simple melodies at sight, sight-reading various rhythmic patterns, and dictating simple melodies and chord progressions. Prospective music majors, especially those with prior singing experience, typically skip this course and begin with MUR 113.

110. Introduction to Music Theory.
Basic concepts addressing students with previous experience in an instrument or voice and little music theory. Scales, keys, intervals, chords, basic part-writing, and other fundamental aspects of musical structure. Some ear training and aural skills.

111. Theory I.
Prerequisite: MUR 101, 110, or permission of instructor (placement test).
The first in a four-course sequence. Deals with basic elements of harmony, voice-leading, and analysis. Part-writing in chorale style teaches elementary aspects of tonal theory. Prospective music majors should begin their theory requirement with this course.

112. Theory II.
Prerequisite: MUR 111.
Continuation of MUR 111. This course continues with chorale and keyboard-style harmony exercises, but also introduces chromaticism, modulation, and analysis of form and phrase structure.

113. Musicianship II.
Credit—1 hour
This course develops basic musicianship skills with an emphasis of diatonic sight-singing, rhythmic sight-reading, and dictation of diatonic melodies and chord progressions. The exercises and in-class activities are similar to MUR 109 but at a more advanced level.

114. Musicianship III.
Prerequisites: MUR 113 or permission of theory coordinator.
Credit—1 hour
Continuation of MUR 113 with an increased emphasis on chromaticism, especially simple modulation and mode mixture. The course puts emphasis on ensemble singing and aural analysis.

115. Musicianship IV.
Prerequisite: MUR 114.
Credit—1 hour
Continuation of MUR 114 with greater emphasis on chromaticism and aural analysis.

116. Keyboard Skills I.
Prerequisite: permission of instructor.
Credit—2 hours
Introduces students to the keyboard as a vehicle for broader musical development. Covers basic piano technique, sight-reading of simple chord progressions, realization of figured bass, and basic improvisation. No prior keyboard training required.

117. Keyboard Skills II.
Prerequisite: MUR 116 or permission of instructor.
Credit—2 hours
Continuation of MUR 116. Students completing this course fulfill the piano proficiency for the music major.

Credit—2 hours
River Campus student elective course. No previous keyboard instruction and cannot read music. Includes technique, fundamental skills, and repertoire. *Note: limited seating due to keyboard availability; no additional students taken once the sessions are full. Classes are on ESM campus.

Credit—2 hours
Continuation of MUR 118.

120. Symphony and the Conductor.
Glimpses into the world of standard performance and an overview of the métier of the orchestra conductor. In addition to the ability to read music, and knowledge of basic theory, the participants must have a love for and active interest in symphonic music.

121. World Music.
This course explores some of the world’s major traditions of musical performance; classical, ritual, and ceremonial music globally. We will study musical sound structures within a variety of social, political, and religious contexts, investigating relationships between music, people, and place. Looking at many fascinating but less familiar forms of musical expression; aboriginal pop music from Australia, throat-singing traditions of Tuva and Mongolia, and freedom songs of South Africa.
122. History of Jazz.
This study of Jazz, as an American musical art form. Less a strictly chronological approach, focusing on jazz titans, by their seminal and permanent influences, such as Louis Armstrong, Miles Davis, Coleman Hawkins and Charlie Parker. Blues, ragtime, swing, bebop, cool, progressive, and free jazz are terms that will help define that landscape.

123. Music of Black Americans.
Study of Black American Christian musical beginnings, including forms of worship, early musical practices, the Spiritual, evolution of Gospel. An examination of antebellum musical activities follows including secular song types, character of the folk music with respect to poetic and musical form, language and themes. Attention will be given to significant literary and aesthetic developments, especially during the Harlem Renaissance and the poetry of several writers of that era will be surveyed. The course will treat Blues, its origins evolution through the 1940s. Surveys of classical music forms from the 18th to mid-20th century; music of the theater from minstrelsy to Broadway; precursors of jazz, the syncopated dance orchestra and brass bands; early jazz to bebop round out the course offerings.

Prerequisite: none.
This course explores the history of rock music, emphasizing primarily the period between 1955-1990. Discussion and reading focusing on identifying a variety of rock-music styles within the historical context of the development, transformation, and interaction of pop styles. Issues of technological development, social, political, and cultural context, race and gender, and music-business practices will also be considered.

126. Opera.
Prerequisite: ability to read music.
A small number of representative operas will be used to highlight the history of this controversial 400-year old art form and its creators, performers, and audiences. Drama, music, staging, spectacle, and dance will be examined as components of production. Divas welcome.

127. The Blues.
See online course description for REL 131.

Prerequisite: none.
This course will focus primarily on women composers but will also include material on women as performers, patrons, and consumers, as well as consideration of the role that gender plays in the experience of music.

130. The Beatles, British Invasion, Psychedelia.
The history of the Beatles career and music is explored in the context of the band’s stylistic development, as well as against the backdrop of social, cultural, technical, and music-business events and issues of the 1950s, 60s and 70s. No background in music theory or ability to play a musical instrument is required.

Prerequisite: none.
This course surveys rock music in the 1970s, paying special attention to ways in which 70s styles developed out of 60s styles. Artists considered will include Jimi Hendrix, Cream, Yes, Led Zeppelin, The Who, The Allman Brothers, The Eagles, Black Sabbath, The Cars, Tom Petty, The Sex Pistols and Elvis Costello, plus many more.

133. Musical Theater Workshop.
Prerequisite: one year of voice instruction; permission of instructor (by audition).
Intensive practical experience with scene-and-song work in the repertory of popular musical theater genres. Weekly rehearsals and critique sessions, with emphasis on characterization, technical skills, sub-textual dimensions, and stylistic considerations. Some reading assignments, but emphasis is on performance preparation. Initial and concluding videotaping of “audition piece.”

134. Musical Style and Genre.
Prerequisite: MUR 112 or permission of instructor.
An introduction to the history of Western classical music from the Middle Ages to the present, with emphasis on recognition of the chief stylistic characteristics and understanding of major genres of each period.

135. Sondheim and Modern Musical Theater.
A survey of the modern musical theater through the works of Stephen Sondheim, from West Side Story through Passion. A brief history of the American musical from Show Boat through the mid-fifties, then in-depth study of each of Sondheim’s major Broadway musicals. Analysis of lyrics, musical forms and idioms, process of adaptation, and production.

136. Shakespeare and Music.
Prerequisite: none.
Music is inextricably woven into the plays of Shakespeare, and those plays have inspired composers for hundreds of years. The course investigates the musical world of Shakespeare’s day, the specific uses of music within his plays, their revivals, and the musical representation of Shakespearean themes by later composers, including Mendelssohn, Tchaikovsky, Verdi, and Britten.

See online course description for REL 217.

145. High Voltage: Heavy Metal Music and Its History.
Behind the screaming guitars, thundering pulse, and soaring vocals of heavy metal music lies an impressive history of censorship, rebellion, and redemption. Emphasis on musical structure and
the fascinating social/cultural history of hard rock and metal. Over 40 years of hard rock and metal trends will be discussed—Sabbath to Stryper to Slipknot—and several guest musicians and lecturers will complement the course materials with performances and anecdotes.

**150. Women’s Glee Club.**
*Credit—1 hour*

The Women’s Glee Club, a group of students, alumni, faculty, staff and community members, performs a wide variety of music. Joint concerts with the Men’s Glee Club and various instrumental groups within the college are regularly programmed. To join, simply register for the class. Auditions will be held during the first class.

**151. Men’s Glee Club.**
*Credit—1 hour*

The Men’s Glee Club continues the century-old tradition of singing at the University. Students, faculty, staff, and community members perform a wide repertoire of music. The men’s and women’s glee clubs regularly combine with various instrumental groups to perform large oratorio-style works. Auditions will be held during the first class.

**152. University Chamber Singers.**
*Credit—1 hour*

Chamber Singers is a select 28- to 32-member ensemble which performs a cappella and chamber music from the 14th to the 21st centuries. The group is as comfortable singing jazz as performing Renaissance motets. All members of the undergraduate and graduate student body are welcome to audition for the ensemble. Auditions are held every semester.

**153. Symphony Orchestra.**
*Credit—1 hour*

URSO (Symphony Orchestra) is a University-civic orchestra whose members are selected from both the University student body and greater Rochester community. Membership through auditions, occurs prior to the first rehearsal of each season. Other auditions may be held as needed throughout the season.

**154. Chamber Orchestra.**
*Credit—1 hour*

URCO (Chamber Orchestra) Membership is limited and is granted by the music director through competitive auditions, which occur prior to the first scheduled rehearsal of each season. Auditions may be held as needed during the academic year.

**155. Chamber Ensembles.**
*Prerequisite: permission of the coordinator. Credit—1 hour*

The chamber music program facilitates formation and coaching of serious advanced chamber ensembles. One academic credit may be earned by registering and successfully completing all requirements listed under coursework.

**156. Wind Symphony.**
*Credit—1 hour*

Wind Symphony draws its membership primarily from the student body on River Campus and performs music of various styles, genres, and eras. Membership by audition. One rehearsal per week; individual practice. At least four concerts per academic year. Attendance required at all rehearsals, dress rehearsals, and concerts, unless excused in advance by conductor.

**157. Jazz Ensemble.**
*Credit—1 hour*

The Jazz Ensemble is open by audition to all University of Rochester community, and performs a wide variety of music. Occasional guest artists and clinicians. (Fall and Spring)

**158. Gospel Choir.**
*Credit—1 hour*

One rehearsal per week. Two concerts per semester. In addition, there may be off-campus performances in local colleges, churches, and other venues in the greater-Rochester community. The Gospel Choir performs a varied repertoire of sacred music -- spirituals, hymns, traditional and contemporary Gospel, music of the praise-and-worship genre. (Fall and Spring)

**159. Gamelan Ensemble.**
*Credit—1 hour*

The Eastman Gamelan performs traditional ceremonial music and new-style music (keybar) from Bali and also new compositions for Gamelan. (Fall and Spring)

**160. Advanced Piano Study.**

Weekly one-hour private studio instruction with our artist-in-residence, Ms. Zora Mihailovich. Comparable to Eastman’s PA 160, with occasional master classes, group workshops, and coaching. Designed for advanced students to develop their abilities for piano performance by learning new repertoire, improving piano skills/technique, and learning how to practice efficiently.

**161. Broadcasting in the Digital Age.**

A descriptive and critical analysis of the nature of electronic mass media, broadcast practices and impact. Designed to provide a broad, rigorous orientation for understanding basic elements of media production as well as skills training in reporting, writing, editing, delivery and production of broadcast media.

**162. Music and the Mind.**

See online course description for 6TH 260 (ESM).

**165. Mbira Ensemble.**

See online course description for ENS 216 (ESM).
BEGINNER AND INTERMEDIATE

170. Brass Choir.
Brass Choir is a 35–45 member ensemble dedicated to performing quality brass music at a high level while fostering a spirit of community among brass players on the River Campus. Open to experienced trumpet, horn, trombone, euphonium, and tuba players.

175. Percussion Ensemble.
Prerequisites: prior experience in percussion, ability to read music, and an audition.
A serious contemporary ensemble that performs works from the standard percussion ensemble repertoire, occasionally the less standard, and brand new compositions for this genre. Some of the composers whose repertoire we have performed in the past consist of Hollinden, Rouse, Beck, Cowell, Peck, Cage, and Andriessen.

180. Rock Repertory Ensemble.
Prerequisite: audition.
The Rock Repertory Ensemble is devoted to performing accurate versions of songs from the rock music repertory, with selections ranging from the early 1950s to the present day. Open to guitarists, bassists, drummers, keyboard players, and singers, with consideration given to winds players depending on repertory for a given semester.

201. Basic Jazz Theory and Improvisation I.
Rudiments of jazz, including chord and scale spellings, chord scale relationships, jazz/pop chord symbol nomenclature, basic forms, chord substitutions, piano voicing; strong emphasis on ear training and vocalization and transcription from records of jazz solos.

202. Jazz Theory and Improvisation II.
Continuation of MUR 201.

211. Theory III.
Prerequisite: MUR 112.
Continuation of MUR 112. Focuses on analysis of large forms, such as sonata, rondo, and song forms. Includes advanced study of chromatic harmony and modulation to remote keys.

212. Theory IV.
Prerequisite: MUR 211.
Continuation of MUR 211. Explores the theoretical and aesthetic principles of twentieth-century music, especially in relation to earlier compositional procedures. Introduces basic post-tonal theory, including set-class analysis, transformational theory, and serial techniques.

Prerequisite: MUR 112.
Many people love pop music for its simplicity, but this course will reveal that pop music can often be surprisingly complex in the ways it projects structure and creates musical relationships. Many dimensions of pop music will be analyzed, including harmony, melody, rhythm and meter, texture, form, recording technique, and text-music relationships.

221. History of Western Music to 1600.
Prerequisite: completion of or current enrollment in MUR 111.
Survey of Western classical music through 1600, including the investigation of style, genre, transmission, contemporary theory, patronage, cultural context and meaning, etc. Workshops deal with topics such as transcription and performance practice. For sophomores and above.

222. History of Western Music 1600–1750.
Survey of Western classical music from ca. 1600 to the mid-eighteenth century, with emphasis on the stylistic, generic, and performance innovations of the period; opera receives special attention. Workshops investigate specific problems posed by notation, performance, ethics, and so on.

223. History of Western Music 1750–1850.
The history of western art music from approximately 1730-1850, with an emphasis on analysis of the masterpieces of tonal music and their relationship to society and other arts. Lectures with extensive listening, reading, and analysis.

History of western art music from approximately 1850 through the present, with emphasis on the changing meaning of “New Music” and its role in society. Analysis of post-Wagnerian tonal music and non-tonal alternatives. Lectures, with extensive listening and reading, as well as analytical assignments.

233. Advanced Musical Theater Workshop.
Continuation of MUR 133.

235. Progressive Rock in the 70s.
Seminar course designed for graduate/advanced undergraduate music students having a strong background in music history and analysis. Closely examining music of 1970s progressive rock bands, with emphasis on Yes, Genesis, King Crimson, Emerson Lake & Palmer, and Gentle Giant. Students will transcribe passages, closely analyze, and consider music in terms of issues of form, texture, harmony, melody, instrumentation, as well in relation to a variety of music-historical and aesthetic contexts.
Naval Science

Professor

Jeffrey S. Bartkoski, Captain, USN, MA (Kings College University of London)
Professor of Naval Science

Associate Professor

Edward J. Fischer, Commander, USN, MS (Old Dominion University)
Associate Professor of Naval Science

Assistant Professor

David Chapman, Captain, USMC, BA (Trinity College)
Assistant Professor of Naval Science

Shara Chapman, Lieutenant, USN, BA (Iowa State University)
Assistant Professor of Naval Science

Matthew Scheel, Lieutenant, USN, BA (University of Missouri)
Assistant Professor of Naval Science

Kyle Thayer, Lieutenant, USN, BS (U.S. Naval Academy)
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 1943. The NROTC Program is open to both male and female students. Any student, not just NROTC midshipmen, may enroll in courses offered by the Department of Naval Science.

Students participate in the NROTC Program in one of three options:

- **NROTC Scholarship Program** students are selected by national competition. Applications may be submitted online at www.nrotc.navy.mil and are usually due by January of the senior year in high school. Students are subsidized by the Navy for tuition, fees, textbooks, and uniforms, and they receive a monthly stipend 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, USN, or Second Lieutenant, USMCR, upon graduation and to serve on active duty for a minimum of four years and for a minimum of four years in the inactive reserve. Any questions should be directed to the Department of Naval Science on the ground floor of Morey Hall.

- **NROTC College Program** is available to first- and second-year college students 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 monthly stipend during the junior and senior years. College Program students are eligible to compete for either three- or two-year scholarships based on their performance in the program 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.

- **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 College 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 E-5 enlisted.

**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 students are pursuing their major. Students who are thinking about applying to an NROTC program are encouraged to enroll in a naval science course.

**NROTC**

**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.
School of Arts and Sciences

Naval Science - 193

First Year
NAV 093. Introduction to Naval Science
NAV 250. Sea Power and Maritime Affairs

Second Year
NAV 265. Leadership and Management
NAV 098. Navigation I (USN midshipmen)
NAV 251. Evolution of Warfare (USMCMidshipmen)

Third Year
NAV 094. Naval Engineering (USN midshipmen)
NAV 249. Naval Weapon Systems (USN midshipmen)
NAV 099. Amphibious Operations I (USMCMidshipmen)

Fourth Year
NAV 222. Naval Operations and Seamanship (USN midshipmen)
NAV 266. Leadership and Ethics

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. One year of calculus and calculus-based physics is required for all Navy Option scholarship midshipmen. Marine Option midshipmen will take Amphibious Operations (NAV 99), Evolution of Warfare (NAV 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
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

093. Introduction to Naval Science.
Organization, administration, customs, careers, warfare platforms and basic leadership fundamentals as well as joint warfare and national military strategy. Current world events are discussed as applicable.

094. Ship Systems I.
Detailed study of ship characteristics and types including ship design, hydrodynamic forces, stability, compartmentation, propulsion, electrical and auxiliary systems, interior communications, ship control, and damage control. Included are basic concepts and theory and design of steam, gas turbine, diesel and nuclear propulsion.

098. Navigation I.
International and United States inland rules of the nautical road, relative motion, Vector-Analysis Theory, formation tactics and ship employment. Introduction to naval operations and operations analysis, ship behavior and characteristics in maneuvering, applied aspects of ship handling, and afloat communications.

099. Amphibious Operations.
Organization, techniques and strategies employed by the U.S. Navy and Marine Corps in the conduct of amphibious operations. Track the evolution of amphibious warfare from antiquity through the 20th century and become familiar with amphibious ships, landing craft and vehicles as they are used by today’s military.

222. Naval Operations and Seamanship.
Further develop knowledge and practical skills learned in Navigation I (NAV 098). Introduction to Naval Operations at sea covering topics in four broad sections including: (1) Advanced Navigation; charts, maneuvering board, formation sailing, nautical rules of the road and international laws of the seas; (2) Communications security, radio procedures, tactical communications and maneuvering; (3) Operations Operations shipboard watch-standing, ship-handling evolutions; (4) Naval Doctrine and Joint/Combined Operations. Prepares midshipmen for a first tour in the active surface ship fleet.

249. Ships Systems II.
Investigate theories and implementation of Naval weapons systems. Explore fundamentals of target detection (using RADAR and SONAR), warhead and fuse design, guidance and control principles, propulsion and launching, fire control, and mine warfare. Case studies are utilized during the course to aid the student in understanding the concepts of Command, Control, and Communication and as a starting point for discussions on leadership and ethics. Current world events and historical issues are discussed as applicable.

250. Seapower Maritime Affairs.
U.S. naval history from the American Revolution to the present with emphasis on major developments. Geopolitical theory of Mahan, applied to the current maritime strategies of the United States.

251. Evolution of Warfare.
Basic understanding of the art and concept of warfare from the beginning of recorded history to the present day as well as the threads of continuity and the interrelations of political, strategic, operational, tactical and technical levels of war from the past. Applying the same principles and concepts to the battlefields of today and the future.

265. Leadership and Management II.
Fundamental theoretical concepts of leadership management. Develop practical leadership tools that can be derived from the theoretical concepts.
266. Leadership and Ethics.

Explore the moral, ethical, and legal issues facing leaders in industry, society, and the military while reinforcing the key underlying principles of leadership. Case studies are used in a seminar format to underscore the issues. The overall objective of this course is to develop critical thinking and reasoning skills in leadership situations, particularly those that pose a moral or ethical dilemma to the individual.

**Philosophy**

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**Professor**

Gregory N. Carlson, PhD (Massachusetts)
Professor of Linguistics, of Philosophy, and of Brain and Cognitive Sciences

Earl Conee, PhD (Massachusetts)
Professor of Philosophy

Randall Curren, PhD (Pittsburgh)
Professor of Philosophy and of Education; Chair of the Department

Richard Dees, PhD (Michigan)
Professor of Philosophy, of Neurobiology, of Pediatrics, and of Medical Humanities

Richard Feldman, PhD (Massachusetts)
Professor of Philosophy; Dean of the College

Ralf Meerbote, PhD (Harvard)
Professor of Philosophy

Deborah Modrak, PhD (Chicago)
Professor of Philosophy

Edward Wierenga, PhD (Massachusetts)
Professor of Religion and of Philosophy

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**Associate Professor**

William J. Fitzpatrick, PhD (California, Los Angeles)
Associate Professor of Philosophy

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**Assistant Professor**

Alyssa Ney, PhD (Brown)
James P. Wilmot Distinguished Assistant Professor of Arts, Sciences, and Engineering and Assistant Professor of Philosophy

Brad Weslake, PhD (Sydney)
Assistant Professor of Philosophy

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**Senior Lecturer**

John Gates Bennett, PhD (Michigan)
Senior Lecturer in Philosophy

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**Professor Emeritus**

Rolf A. Eberle, PhD (California, Los Angeles)
Professor Emeritus of Philosophy

Robert Lawrence Holmes, PhD (Michigan)
Professor Emeritus of Philosophy

Dennis O’Brien, PhD (Chicago)
Professor Emeritus of Philosophy

The Department of Philosophy uses approximately eight teaching assistants in large lecture courses as graders or section leaders.

The Department of Philosophy offers programs leading to the BA, MA, and PhD 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 Western philosophy, ancient and modern, and gives particular emphasis to recent and contemporary Anglo-American philosophy. The department’s course offerings provide an excellent foundation for graduate work in law and cognitive science, as well as in philosophy itself. A major in philosophy is also a valuable asset when combined with a major in political science, economics, or natural sciences such as biology, chemistry, geology, physics, and psychology.

The major requirements are designed to assure that students completing the program are familiar with the central texts in the history of philosophy as well as a variety of issues in contemporary philosophy. The department offers a general major in philosophy, as well as three specialized programs. One, the philosophy major with emphasis on law and ethics, is designed primarily for pre-law students and others who are interested in an extensive investigation of the nature of law, value, and social justice. The second special major emphasizes history and is designed for students with both scholarly and philosophical interests in the history of philosophy. The third special major 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.

**BA in Philosophy**

**A total of 10 courses:**
- PHL 110, 201, 202, 300
- Six additional courses, meeting the following conditions:
  - At least three of the courses must be advanced courses in philosophy. Advanced courses are those numbered above PHL 202.
  - At least one of the courses must be in ethics (PHL 102, 103, 116, 118, 220–229, 308, 311).
  - At least one of the courses must be selected from either Logic and Related Courses (PHL 211–219), or Traditional Philosophical Disciplines (PHL 240–249), or Philosophy of Science (PHL 250–259).
  - At least one of the courses must be an advanced philosophy course designated with a “W,” to indicate upper-level writing credit. These courses are available with the permission of the instructor.

**Philosophy Major with Emphasis on Law and Ethics**

**A total of 10 courses:**
- PHL 110, 201, 202, 300
- Six additional courses, meeting the following conditions:
  - At least three of the courses must be advanced courses in philosophy. Advanced courses are those numbered above PHL 202.
  - At least four of the courses must be in law, ethics, or reasoning (PHL 102–106, 116, 118, 220–229, 311).

At least one of the courses must be selected from either Logic or Related Courses (PHL 211–219), or Traditional Philosophical Disciplines (PHL 240–249), or Philosophy of Science (PHL 250–259).

At least one of the courses must be an advanced philosophy course designated with a “W,” to indicate upper-level writing credit. These courses are available with the permission of the instructor.

An advanced course in an allied field may be substituted for a philosophy course with the permission of the philosophy department’s undergraduate advisor.

**Philosophy Major with Emphasis on History**

**A total of 10 courses:**
- PHL 110, 201, 202, 300
- Six additional courses, meeting the following conditions:
  - At least three of the courses must be advanced courses in philosophy. Advanced courses are those numbered above PHL 202.
  - At least one of the courses must be in ethics (PHL 102, 103, 116, 118, 220–229, 311).
  - At least one of the courses must be selected from either Logic and Related Courses (PHL 211–219), or Traditional Philosophical Disciplines (PHL 240–249), or Philosophy of Science (PHL 250–259).
  - At least three of the courses must be history of philosophy courses (PHL 260–269).
  - At least one of the courses must be an advanced philosophy course designated with a “W,” to indicate upper-level writing credit. These courses are available with the permission of the instructor.

An advanced course in an allied field may be substituted for a philosophy course with the permission of the philosophy department’s undergraduate advisor.

**Philosophy Major with Emphasis on Logic and the Philosophy of Science**

**A total of 10 courses:**
- PHL 110, 201, 202, 300
- Six additional courses, meeting the following conditions:
  - At least three of the courses must be advanced courses in philosophy. Advanced courses are those numbered above PHL 202.
  - At least one of the courses must be in ethics (PHL 102, 103, 116, 118, 220–229, 311).
  - At least three of the courses must be selected from either Logic (PHL 211–219) or Philosophy of Science (PHL 250–259).
  - At least one of the courses must be an advanced philosophy course designated with a “W,” to indicate upper-level writing credit. These courses are available with the permission of the instructor.
An advanced course in an allied field may be substituted for a philosophy course with the permission of the philosophy department’s undergraduate advisor.

Ordinarily, students who major in both philosophy and some other discipline will take the advanced courses listed above that are recommended to students in that other discipline.

Qualified students in philosophy may be approved by the department for the Study Abroad Program.

Honors in Philosophy

In the honors program in philosophy, qualifying majors work closely with a faculty member over an extended period of time. Honors students develop a research project over a one- to two-year period, and complete a graduate seminar or undergraduate seminar approved for honors credit. In addition to graduating with honors, this provides an invaluable experience in philosophical research and writing.

To qualify: Admission to the honors program is limited to those students who have at least an A− average (3.7 GPA) in their philosophy courses and show promise of being able to complete an honors thesis.

To apply: Interested students should contact the departmental undergraduate advisor to confirm that they qualify and to find a faculty advisor. This can be done in one of two ways: (a) talk to a faculty member they would like to work with and settle upon a mutually agreeable topic; (b) if they know the topic they want to work on, ask around until they find a faculty member who is interested in supervising work on that topic.

Requirements

- 4 credit hours of a graduate seminar (500 level) or an undergraduate seminar (300 level) approved by the students’ faculty honors advisor for honors credit, taken during the junior or senior year. If an undergraduate seminar is to be used to meet this requirement, the instructor must be notified of this in advance so that arrangements can be made for any additional work that the instructor deems necessary to approximate a graduate-level experience.
- 4 credit hours of Honors Tutorial (PHL 392), ideally taken as two 2-credit courses during the junior year. This tutorial is devoted to reading in preparation for writing an honors thesis.
- 4 credit hours of Honors Thesis (PHL 393), ideally taken as two 2-credit courses during the senior year. These courses are devoted to writing the thesis under the supervision of the students’ honors advisor.
- Writing an honors thesis: An honors thesis is a substantial document (on the scale of about 50 pages) defending or criticizing some philosophical proposition. The thesis must be finished and submitted by April 1 of the students’ senior year, and defended orally before an examining committee by the last day of classes. The examining committee consists of the students’ faculty honors advisor and a second willing faculty member, chosen by the students with the approval of the students’ faculty honors advisor. Both members must approve the thesis before an oral examination can be scheduled.
- Subject to the requirement in the section below, the committee will determine whether to recommend Honors, High Honors, or Highest Honors, or may determine that no recommendation of honors will be made.
- To receive any level of honors, students must satisfy the above requirements with an A− average. In computing this, the thesis (PHL 393) is given the most weight (40 percent), and the tutorial and seminar somewhat less (30 percent each).

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.

Minor in Philosophy

Each minor requires five courses. These should be chosen in consultation with the undergraduate advisor, but need not have a specific focus.

Plan A
PHILOSOPHY OF SCIENCE—PHL 110, 252, and three other courses in philosophy of science (PHL 105, 106, 218, 243, 244, 253, 352, 391).

Plan B
ETHICS—PHL 102 and four other courses in ethics and related areas (PHL 103, 116, 118, 220–229, 311).

Plan C
HISTORY OF PHILOSOPHY—PHL 201 and 202 and three other courses in the history of philosophy (PHL 260–269, 315, 319, 320, 323, 370).

Plan D
PHILOSOPHY—Five courses in philosophy, chosen in consultation with the undergraduate advisor.

Upper-Level Writing Requirement

Philosophy majors must enroll in the seminar for majors (PHL 300) and one advanced course in philosophy designated by a “W” to indicate upper-level writing credit. The “W” designation is available with the permission of the instructor. Both courses provide significant experience in writing through the assignment of a series of short papers, the discussion of philosophical writing, and guidance in the revision and rewriting of papers.

Internships

The department sponsors a variety of internships that combine real-world experience with philosophical inquiry. In the past, these have included internships in law, government, human rights, international affairs, community leadership, and teaching. Teaching interns in the Rochester City School District work
with elementary school children on reading, writing, and critical thinking skills.

Graduate Offerings

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 graduate seminars (see Official Bulletin: Graduate Studies, www.rochester.edu/GradBulletin).

Philosophy is relevant to every program and major 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 majoring in other disciplines:

• anthropology: PHL 102, 103, 105, 201, 202, 247, 252
• biology, chemistry, geology, microbiology, physics and astronomy: PHL 110, 152, 252
• computer science, mathematics: PHL 110, 210–219, 252
• economics: PHL 102, 105, 110, 220, 223, 252
• English, art and art history, modern languages and cultures: PHL 115, 141, 171, 201, 202, 247
• history: PHL 201–202, 260–269
• naval science: PHL 102, 110, 223, 252
• political science: PHL 102, 103, 110, 220–229, 252
• psychology and cognitive science: PHL 241–249, 348
• religion: PHL 101–103, 111, 201, 202, 242, 268

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

INTRODUCTORY COURSES

101. Introduction to Philosophy.

Methods of philosophical inquiry and a variety of philosophical problems of perception and reality, personal identity, freedom and responsibility, existence of a supreme being, morality, knowledge and skepticism.

102. Ethics.

Leading theories of right and wrong, good and evil, and related matters such as the functions of ethical language and the reality or unreality of moral knowledge.

103. Contemporary Moral Problems.

Reasoned analysis of controversies concerning such matters as the death penalty, abortion, individual rights, sexual harassment and discrimination, global justice, terrorism and civil liberties, animal rights and the environment.

105. Reason and Argument.

Methods of identifying, interpreting, reconstructing, and evaluating reasoning found in speeches, essays, editorials, magazine articles, and scientific reports. Analytical methods mastered in this course do not include those of formal symbolic logic.


An examination of both the science behind stem cell research and the ethical issues raised by it.

110. Introductory Logic.

Symbolic logic through first-order quantification theory. Skill in deductive inference is strengthened through construction of proofs and other methods of a rigorously defined artificial language.

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.

115. Philosophy in Literature.

Philosophical issues of morality, human action, and happiness, as seen by 18th-century and later writers: Defoe, Voltaire, Lessing, Shelley, Gide, and Camus. Readings are literary, but discussions and methods are analytical-philosophical.

118. Business Ethics.

Questions and principles of business ethics: moral responsibilities of corporations, truth in advertising, sales practices, bribery, environmental issues, economic justice, nature of the employment contract, whistle-blowing, affirmative action, sexual harassment, corporate organization.

141. Aesthetics.

Aristotle, Shaftesbury, Hutcheson, Burke, Hume, Kant, and others on: What makes a situation aesthetic? What are aesthetic properties and how do we know some objects have them? What are aesthetic values and how do we justify our value judgments?

145Q. Minds and Machines.

How philosophers think about the mind, in light of research in brain and cognitive science: What is it to have a mind? Does the mind have boundaries? What is consciousness? Could a robot experience the world in the same way we do? Discussion-oriented.

152. Science and Reason.

The nature of science and its relationship to religion: Are there criteria that distinguish science from non-science? Is there such a thing as the scientific method? Has knowledge advanced steadily through the history of science? What role do values play in science? Do science and religion conflict? Is intelligent design science?
171. Phil Foundation of Feminism.
Contemporary feminist theory: the conception of women expressed through our practices, laws, theories and literature; equality and equal rights; sex roles and gender specific language; power relations and self-determination; marriage and maternity.

HISTORICAL COURSES

201. History of Ancient Philosophy.
Survey of the origins of Western philosophy, from the Presocratics through Hellenistic philosophy six centuries later. The great philosophers of the Classical period, Socrates, Plato, Aristotle, are studied in detail.

202. History of Modern Philosophy I.
Philosophical responses of the 17th and 18th centuries to the new science and methodology of Galileo and others. Readings from Galileo, Descartes, Leibniz, Newton, Locke, Berkeley, Hume, on methodology, motion, space and time, causality, perception, the mind-body problem.

261. Kant.
Philosophy of Immanuel Kant: primarily the “Critique of Pure Reason,” but also issues of practical and moral philosophy such as volition and free will.

265. Select Topics in Ancient Philosophy.
Foundations of Ancient Greek philosophy from Presocratic to Hellenistic periods. Covers ancient Greek ethics, metaphysics and epistemology, philosophy of mind. Special attention to Plato and Aristotle.

266. Rationalism.
Works of Descartes, Spinoza, and Leibniz, concentrating on the metaphysics, epistemology, logic, and philosophy of mind.

267. British Empiricism.
Works of Francis Bacon, John Locke, and David Hume, examining their views on the nature of induction and empirical knowledge.

268. Augustine, Anselm, and Aquinas.
Three formative philosophical treatments of religious belief on such topics as the existence of God, freedom, providence, and evil.

LOGIC AND RELATED COURSES

214. Logical Methods.
The tools of formal logic and set theory most widely used in contemporary philosophical analysis, such as modal propositional logic and applications: logics of necessity and possibility, tense logic, the logic of counterfactuals, modal predicate logic.

216. Mathematical Logic.
Metatheory of first-order logic. Relationships between validity and provability are addressed through proofs of the consistency and completeness of one or more systems.

217. Uncertain Inference.
Analysis of inference outside logic and mathematics. Probability theory and nonmonotonic logic are used to address uncertainty arising from uncertain premises and rules of inference that are not truth preserving.

218. Philosophy of Mathematics.
Analysis of the nature of mathematical objects and nature and foundations of mathematical knowledge.

219. Deviant Logic.
Alternative logics: logics in which more than two truth values are possible, logics in which not every statement has a truth value, logics that are designed to accommodate vagueness, logics that allow inconsistencies.

ETHICS AND RELATED COURSES

220. Recent Ethical Theory.
Twentieth century classics on questions of moral theory: What makes some acts morally right? How could we ever know what has value and what we morally ought to do? Are there any universally applicable ethical norms, or is morality subjective or otherwise relative?

Political theory associated with the revolution and US Constitution, considered in historical context: predecessors such as John Locke, Montesquieu, and David Hume; works by Thomas Paine and Thomas Jefferson; the Federalist Papers and anti-Federalist works.

223. Social and Political Philosophy.
Nature and justification of government and democracy, conflict and revolution, relations between church and state, moral relations of individuals to government, individual freedom, economic justice. Classic and contemporary readings.

224. History of Ethics.
Theories of ethics throughout history: Socrates, Plato, Aristotle, Augustine, Aquinas, Hume, Kant, Mill, Nietzsche.

225. Ethical Decisions in Medicine.
Principled examination of the ethical dimensions of medical decisions: respect for life, quality of life, patient privacy and autonomy, quality of care, conflicts of interest, allocation of health care resources.
226. Philosophy of Law.

Theories of law and normative and conceptual problems in specific areas of law: transitional justice, jurisdiction, problems of legal interpretation, criminal attempts, the logic of fault, wrongful gain and compensation, moral limitations on freedom of contract, legal aspects of terrorism and torture, etc.

228. Public Health Ethics.

Examines the values of health, social needs, and freedom through a systematic examination of situations in which these conflicts arise. Public health ethics lie at the intersection of medicine, political philosophy, and public policy.

229. Philosophy of Education.

Theories and controversies about the nature and aims of education; boundaries of educational authority; educational adequacy, equality, and justice; learning, inquiry, knowledge, and critical thinking; the measurement of learning; moral and civic education; patriotism, evolution, and sex in the curriculum.


Environmental justice and sustainability, both domestic and global, bringing philosophical and systems analysis to bear on environmental degradation, transparency and governance, climate change, the ethics of consumption and development, responsibility to future generations.

TRADITIONAL PHILOSOPHICAL DISCIPLINES


Investigates topics in contemporary metaphysics, including questions about the existence and persistence conditions of abstract and material objects; the nature of space and time; the possibility of time travel; the status of quantum mechanics. No prior courses in science required.

243. Theory of Knowledge.

Addresses these and related questions using contemporary philosophical readings: What is knowledge? Do people really know anything? What makes a belief justified or rational?

244. Philosophy of Mind.

Overview and assessment of recent debates in philosophy of mind, focusing on the relationship between the mind and the physical world: physicalism about the mind; behaviorism, the identity theory, and functionalist theories of mind; consciousness and mental content; mental causation.

247. Philosophy of Language.

General nature of language and specific puzzles about language: the nature of truth and meaning, speech acts, reference, propositional attitudes, metaphor, understanding, interpretation, indeterminacy, etc.

PHILOSOPHY OF SCIENCE

251. Philosophy of Biology.

Primary focus is the nature, scope, and variety of biological explanations. Possible topics: fitness, natural selection and drift; whether there are biological laws; the degree of contingency of evolutionary outcomes; biological function; the scope of adaptationist explanations. No prior philosophy of science or biology is assumed.

252. Philosophy of Science.

Survey of primarily metaphysical questions about science: Must the entities posited by a scientific theory exist for it to be successful? Do laws of nature govern the world or simply articulate patterns? How are lower and higher level scientific theories related to one another? Is scientific explanation primarily concerned with laws, with causes, or with something else?


Topics may include the structure of cognition; theories of mental representation; explanation and reduction in cognitive science; folk psychology and theory of mind; evolutionary psychology. It is recommended that students first take Philosophy of Mind, Minds and Machines, or a class in Brain and Cognitive Sciences.

256. Darwin and Religion.

Equal parts science, history, and philosophy, on the interaction of science and religion: the rise of modern science and challenges it has posed to religious culture in Europe and America; attitudes toward biblical literalism; Darwin’s evolving scientific, philosophical, and religious views; the relevance of Darwinism to debates over the relationship between science and religion. Reading-intensive and discussion-based.

SEMINARS

300. Seminar for Majors.

Capstone seminar for philosophy majors, it serves as the main writing course for the major. Explores a limited number of changing topics in depth. Limited to students with concentrations and minors in philosophy.

324. Rousseau to Revolution.

Seminar on the works of Rousseau and the crisis of legitimacy in the age of revolution he shaped. Examines works of Rousseau and his contemporaries Voltaire and Denis Diderot, and the philosophical debates about the French Revolution itself, including works by Edmund Burke, Thomas Paine, and Mary Wollstonecraft.

342. Metaphysics.

Seminar on limited, changing topics in contemporary analytical metaphysics.
348. Free Will.
Seminar examining proposed answers to classical philosophical issues concerning free will: What is free will? Is free will compatible with determinism? Is determinism compatible with moral responsibility? Readings may include both historical and contemporary sources.

391. Independent Study.
The reading of philosophical literature under guidance, for seniors majoring in philosophy.

Physics and Astronomy

Riccardo Betti, PhD (MIT)
Professor of Mechanical Engineering and of Physics and Senior Scientist in the Laboratory for Laser Energetics

Nicholas P. Bigelow, PhD (Cornell)
Lee A. DuBridge Professor of Physics and Professor of Optics; Chair of the Department

Eric G. Blackman, PhD (Harvard)
Professor of Physics and Astronomy and Senior Scientist in the Laboratory for Laser Energetics

Mark Bocko, PhD (Rochester)
Professor of Electrical and Computer Engineering and of Physics and Astronomy; Technical Director, Center for Future Health; Affiliated Faculty, Eastman School of Music, Music Theory

Arie Bodek, PhD (MIT)
George E. Pake Professor of Physics

Robert Boyd, PhD (California, Berkeley)
M. Parker Givens Professor of Optics and Professor of Physics

Douglas Cline, PhD (Manchester)
Professor of Physics

Esther Conwell, PhD (Chicago)
Professor (Research) of Chemistry and of Physics

Ashok Das, PhD (SUNY, Stony Brook)
Professor of Physics

Regina Demina, PhD (Northeastern)
Professor of Physics

Charles B. Duke, PhD (Princeton)
Professor (Research) of Physics

Joseph H. Eberly, PhD (Stanford)
Andrew Carnegie Professor of Physics and Professor of Optics

Thomas Ferbel, PhD (Yale)
Professor of Physics

Philippe M. Fauchet, PhD (Stanford)
Distinguished Professor of Electrical and Computer Engineering, Professor of Materials Science, of Biomedical Engineering, and of Optics and Senior Scientist in the Laboratory for Laser Energetics; Director of University of Rochester Energy Research Initiative

William J. Forrest, PhD (California, San Diego)
Professor of Astronomy; Director, C. E. Kenneth Mees Observatory

Thomas Foster, PhD (Rochester)
Professor of Imaging Sciences, of Optics, and of Physics

Adam A. Frank, PhD (Washington, Seattle)
Professor of Physics and Astronomy and Senior Scientist in the Laboratory for Laser Energetics

Yongli Gao, PhD (Purdue)
Professor of Physics

Carl R. Hagen, PhD (MIT)
Professor of Physics

Wayne H. Knox, PhD (Rochester)
Professor of Optics and of Physics and Senior Scientist in the Laboratory for Laser Energetics

Robert L. McCrory, PhD (MIT)
Professor of Mechanical Engineering and of Physics and Astronomy and Senior Scientist in the Laboratory for Laser Energetics; Vice Provost, University of Rochester; Director and CEO of the Laboratory for Laser Energetics
Kevin S. McFarland, PhD (Chicago)
Professor of Physics

Adrian C. Melissinos, PhD (MIT)
Professor of Physics

David D. Meyerhofer, PhD (Princeton)
Professor of Mechanical Engineering and of Physics and Senior Scientist in the Laboratory for Laser Energetics; Director of the Experimental Division

Lukas Novotny, Doctor of Technical Sciences (Swiss Federal Institute of Technology)
Professor of Optics, of Physics, and of Biomedical Engineering and Scientist in the Laboratory for Laser Energetics

Lynne Orr, PhD (Chicago)
C. E. Kenneth Mees Professor of Physics

Sarada G. Rajeev, PhD (Syracuse)
Professor of Physics and of Mathematics

Lewis Rothberg, PhD (Harvard)
Professor of Chemistry, of Chemical Engineering, and of Physics

Wolf-Udo Schröder, PhD (Darmstadt)
Professor of Chemistry and of Physics

Yonathan Shapir, PhD (Tel Aviv, Israel)
Professor of Physics, of Chemical Engineering, and of Mathematics

Paul F. Slattery, PhD (Yale)
Professor of Physics

Roman Sobolewski, PhD (Warsaw)
Professor of Electrical and Computer Engineering, of Materials Science, and of Physics and Senior Scientist in the Laboratory for Laser Energetics

Carlos R. Stroud, Jr., PhD (Washington, St. Louis)
Professor of Optics and of Physics

Ching W. Tang, PhD (Cornell)
Doris Johns Cherry Professor of Chemical Engineering, Professor of Chemical Engineering and of Physics

John A. Tarduno, PhD (Stanford)
Professor of Geophysics and of Physics

Stephen L. Teitel, PhD (Cornell)
Professor of Physics

John H. Thomas, PhD (Purdue)
Professor of Mechanical and Aerospace Sciences and of Astronomy

Edward H. Thorndike, PhD (Harvard)
Professor of Physics

Dan M. Watson, PhD (California, Berkeley)
Professor of Physics and Astronomy

Emil Wolf, DSc (Edinburgh)
Wilson Professor of Optical Physics and Professor of Optics

Frank L. H. Wolfs, PhD (Chicago)
Professor of Physics

Jianhui Zhong, PhD (Brown)
Professor of Imaging Sciences, of Biomedical Engineering, and of Physics

Antonio Badolato, PhD (California, Santa Barbara)
Assistant Professor of Physics

Aran Garcia-Belido, PhD (London)
Assistant Professor of Physics

Andrew Jordan, PhD (California, Santa Barbara)
Assistant Professor of Physics

Eric F. Mamaek, PhD (Arizona)
Assistant Professor of Physics

Theodore Castner, PhD (Illinois)
Professor Emeritus of Physics

H. Lawrence Helfer, PhD (Chicago)
Professor Emeritus of Astronomy

John Huizenga, PhD (Illinois)
Tracy H. Harris Professor Emeritus of Chemistry and Professor Emeritus of Physics

Edward H. Jacobsen, PhD (MIT)
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Robert S. Knox, PhD (Rochester)
Professor Emeritus of Physics and Senior Scientist in the Laboratory for Laser Energetics

Daniel S. Kolrun, PhD (Princeton)
Professor Emeritus of Physics and Senior Scientist in the Laboratory for Laser Energetics

Susumu Okubo, PhD (Rochester)
Professor Emeritus of Physics

Judith L. Pipher, PhD (Cornell)
Professor Emerita of Astronomy

Malcolm P. Savedoff, PhD (Princeton)
Professor Emeritus of Astronomy

Stewart Sharpless, PhD (Chicago)
Professor Emeritus of Astronomy

Albert Simon, PhD (Rochester)
Professor Emeritus of Mechanical Engineering and of Physics and Senior Scientist in the Laboratory for Laser Energetics

Robert L. Sproull, PhD (Cornell)
Professor Emeritus of Physics

Hugh Van Horn, PhD (Cornell)
Professor Emeritus of Physics and Astronomy

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 non-scientist to a minor in physics or in physics and astronomy and complete degree programs leading to the BA and BS in physics or in physics and astronomy (astrophysics). The graduate program offers advanced courses that are open to undergraduates seeking in-depth study.

Students have until the end of their sophomore year to declare their major. However, first- or second-year students wishing to major in physics or in physics and astronomy can alert the department’s Office of Undergraduate Studies well before the end of their sophomore year to 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 141, 142, 143, and 237. The Stoddard Prize is awarded for the best senior thesis. The Fullbright Prize is awarded for the best performance in the Advanced Laboratory. The John E. Flagg Award is given annually to the graduating senior who has compiled the best academic record in undergraduate courses. A complete description of the requirements for these prizes is available at the department’s Office of Undergraduate Studies, 211 Bausch & Lomb Hall.

Of particular interest to students not majoring in the natural sciences are PHY 100, 102, 103, AST 102, 104, 105, 106. These courses provide either broad surveys or are focused on selected topics, but do not require any special background. Students with interest in science and music will find PHY 103 highly appropriate. For those desiring a working knowledge of basic physics, PHY 113, 114 or PHY 121, 122, 123 are appropriate, the latter requiring a background in high school science and mathematics, as does AST 111. AST 142, a survey of astrophysics, is designed for the physical science major with a background in general physics. The sequence PHY 141, 142, 143 is recommended for all students with interest and abilities in physics, and is most appropriate for those wishing to major in the department. A student who does well in the PHY 121, 122, 123 sequence should be equally well prepared to pursue one of the department’s degree programs.

Based on scores on the Advanced Placement Test or the equivalent (and an interview), students can enter the department degree programs with advanced standing.

**BA and BS in Physics**

The BA program is appropriate for students desiring a broad academic experience. It also provides greater flexibility when planning a joint degree with another department. The BS degree in physics is intensive and provides stronger preparation for graduate school in physics or a closely related science. Students planning to pursue graduate study normally elect the BS program; they are strongly encouraged to take advantage of opportunities for independent reading or research provided by PHY 391, 393, and 395.

**BA in Physics**

Requirements beyond the first two years:
- PHY 217, 235W, 237; one additional course chosen from among the following: PHY 218, 227, 243W, 246.
- An additional 4 credit hours of approved 200- or 300-level physics or physics and astronomy courses.
- Eight additional credit hours (usually two 4-credit-hour courses), which can be approved 200- or 300-level physics or physics and astronomy courses, 200-level mathematics courses, or other science or engineering courses (not necessarily at the 200 level). Because MTH 281 is required for many of the 200-level physics courses, the options are more restrictive than they seem.
- All course choices must be approved by the undergraduate physics advisor.

**BS in Physics**

Requirements beyond the first two years:
- PHY 217, 218, 227, 235W, 237, 246 (or their close equivalents); PHY 243W or 244W; an additional 4 credit hours of approved 200- or 300-level physics or physics and astronomy courses.
- Two advanced courses in mathematics (MTH 281 is required; MTH 282 or OPT 287 are recommended).
- Computer literacy. This requirement can be satisfied by receiving a passing grade in PHY 256 (Computational Physics, taken preferably in the sophomore year), an introductory college computing course (preferably CSC 161 taken in the first year, but CSC 171 is also acceptable), or by completing a computing-based problem approved by the department’s undergraduate physics advisor (possibly one associated with a previous class) or by having a faculty member familiar with the students’ work certify the computer literacy.
- All course choices must be approved by the undergraduate physics advisor.

Students with a prior knowledge of basic physics and differential and integral calculus should take PHY 141 and 143 in their freshman year and PHY 142 in their sophomore year; others should take PHY 121 in the spring of their freshman year and PHY 122 and 123 in their sophomore year. A synopsis of a typical program for the BS in physics follows:

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<th>First Year</th>
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<tr>
<td>PHY 141</td>
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<td>MTH 161</td>
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<td>PHY 142</td>
<td>PHY 237</td>
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<td>MTH 164</td>
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Minor in Physics

- An introductory physics sequence: PHY 121 or 141 (Honors), 122 or 142 (Honors), and 123 or 143 (Honors).
- Four semesters of mathematics: MTH 161, 162, 164, 165 (or their close equivalents).
- Any three of the following courses: PHY 217, 218, 227, 235W, 237, 243W, 244W, 245W, 246, 251, 252, 253, 254, 255, and 256.
- All course choices must be approved by the undergraduate physics advisor. The advisor will be concerned with the general coherence of the program, the students’ plans to take any prerequisites, and mutual reinforcements between the minor and the students’ major studies.

For admission to the minor, students must have attained a C average in both the introductory physics sequence and the introductory mathematics courses that are prerequisites for the introductory physics courses.

BA and BS in Physics and Astronomy

The programs leading to the BA and BS degrees in physics and astronomy are effectively double degree programs. Students planning to pursue graduate study should elect the BS 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 can be modified to fulfill the students’ academic goals.

Approval from the astronomy advisor is required for all proposed 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 BA and BS in physics, except that AST 111 and 142 are normally taken in place of the electives in the first two years.

Background knowledge equivalent to that contained in AST 111 and 142 is needed for completion of the degrees (AST 142 is recommended).

BA in Physics and Astronomy—Astrophysics

Requirements beyond the first two years:

- Two of the following courses: AST 231, 232, 241, or 242.
- Three additional 200-level physics or astronomy courses. Two of the three courses must be selected from the following list: PHY 217, 227, 235W, 237.
- Two additional 200-level technical courses, which can be in physics, mathematics, or another science or engineering. Some engineering courses at the 100-level may also be acceptable, with prior approval from the undergraduate astronomy advisor.
- At least a 2.0 (C) average in astronomy, physics, and mathematics courses must be maintained.
- All course choices must be approved by the undergraduate astronomy advisor.

BS in Physics and Astronomy—Astrophysics

Requirements beyond the first two years:

- Three of the following courses: AST 231, 232, 241, or 242.
- A total of six courses in physics at the 200 level or beyond: PHY 217, 218, 227, 235W, 237, 243W, 245W, 246 (or close equivalents), or AST 393W (Senior Thesis). PHY 218 and 243W are recommended.
- Two courses in advanced mathematics: MTH 281 and 282 are recommended.
- At least a 2.0 (C) average in astronomy, physics, and mathematics courses must be maintained.
- All course choices must be approved by the undergraduate astronomy advisor.

Students with a prior knowledge of basic physics and differential and integral calculus should take PHY 141 and 143 in their freshman year and PHY 142 in their sophomore year; others should take PHY 121 in the spring of their freshman year and PHY 122 and 123 in their sophomore year. A synopsis of a typical program for the BS in physics and astronomy follows:

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<td>PHY 141</td>
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<td>AST 111</td>
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<td>MTH 164</td>
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<td>PHY 217</td>
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<td>PHY 235W</td>
<td>PHY 227</td>
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<td>MTH 281</td>
<td>MTH 282</td>
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<td>AST 232</td>
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Minor in Astronomy

- An introductory physics sequence: PHY 121 or 141 (Honors), 122 or 142 (Honors), and 123 or 143 (Honors).
- Four semesters of mathematics: MTH 161, 162, 164, 165 (or their close equivalents).
- The introductory astrophysics course: AST 142.
- Three 200-level astronomy courses. These courses are offered on a two-year cycle. They usually require concurrent or prerequisite registration in 200-level mathematics and physics courses.
- All course choices must be approved by the undergraduate astronomy advisor.

For admission to the minor, a student must have attained a C average in the introductory 100-level astronomy courses, and a C average in the introductory physics and mathematics courses. Physics majors can minor in astronomy.

Upper-Level Writing Requirement

Students must fulfill the upper-level writing requirement and can do so by taking two upper-level writing courses within the department. In particular, AST 231W, 232W, 391W, 393W, 395W, and PHY 235W, 243W, 244W, 245W, 391W, 393W, 395W can be used for such purpose. This issue should be discussed with the undergraduate advisor.

Certificate in Biological, Medical, or Biological and Medical Physics

Requirements

In order to be eligible for the Certificate in Biological or Medical Physics, students must be approved by the Certificate committee and obtain at least a C+ in each of the following seven courses:

- PHY 235
- PHY 237
- One of the following courses: PHY 217, 218, 227, or 262
- One of the following courses: MTH 181 or 182
- One of the following courses: BIO 110, 111, or 198
- One of the following courses: CHM 131, 132, 171Q, 232, or 252
- One advanced course in biological or medical physics, e.g., PHY 252 or 253

Citation for Achievement in College Leadership

Requirements

The Department of Physics and Astronomy courses for this program are listed below.

- PHY 386—Teaching Internship I, Pedagogy Training and a workshop leader for one of the following courses: PHY 113, 122, 141, or 142.
- PHY 387—Teaching Internship II, Pedagogy and Group Leadership and a workshop leader for one of the following courses: PHY 102, 114, 121, 123, or 143.
- PHY 390A—Supervised Teaching with Leadership Focus and a workshop leader from one of the courses listed above as long as not a repeat. Prerequisites: PHY 386 and 387.

BS-MS Program in Physics or in Physics and Astronomy

Physics or physics and astronomy majors who wish to go beyond the bachelor’s level may enroll in the department’s five-year general BS option in physics or in physics and astronomy with an MS in a subfield represented by the department. Students are encouraged to apply to a 3-2 program in the spring of the junior year and can begin graduate-level work in the fourth year. The BS is ordinarily completed by the end of the fourth year, and requirements for the MS are completed by the end of the fifth year. The MS degree may be pursued via plan A (with master’s thesis) or plan B (with comprehensive exam). Some financial assistance may be available during the fifth year. Further details and program requirements can be obtained from the department’s Office of Graduate Studies.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

UNDERGRADUATE PHYSICS

100. The Nature of the Physical World.

This is an introductory course designed especially for students in the humanities and other non-scientific fields who are interested in learning something about the physical world. Topics include the scale of the universe from galaxies to atoms and quarks; the fundamental forces of nature, motion and relativity, energy, electromagnetism and its everyday applications, the structure of matter, atoms, light and quantum mechanics. There are no prerequisites, no background knowledge is required and the material will be presented with very little mathematics. Substantial use will be made of demonstrations.

102. Visions of the Multiverse.

This is an introductory course designed especially for students in the humanities and other non-scientific fields who are interested
in learning about science, physics and concepts (esp. scientific concepts) of a multiple universe reality. Topics include the nature of science, Newton’s laws, relativity, light, quantum mechanics, the nature of particles and forces, and cosmology. In the course of surveying the modern scientific view of the universe, a number of serious concepts of a multi-universe reality will be examined, including the many-worlds view of quantum mechanics, and fractal and cyclical cosmologies. There are no prerequisites, no background knowledge is required and the material will be presented with very little mathematics. Substantial use will be made of demonstrations. This course is intended to be equivalent to our Physics 100 course in terms of satisfying cluster requirements.

A study of the physical basis of musical phenomena with a focus on demonstration and experimentation. Theories of musical instruments acoustics, spectral analysis, room acoustics, and special topics selected by the class and instructor. One lecture and one lab per week. Time in lab at the end of the semester is devoted to individual student projects, often involving construction and analysis of student instruments. The course is open to any student with a strong interest in both science and music.

113. General Physics I.
First semester of a two-course sequence suitable for students in the life sciences. Newtonian particle mechanics, including Newton’s laws and there applications to straight-line and circular motions, energy; linear momentum, angular momentum; and harmonic motion; Kepler’s laws; planetary and satellite motions. Calculus used as needed. In addition to two 75-minute lectures, one three-hour laboratory every other week and one workshop/recitation per week are required. The laboratory and workshop/recitations times are determined by the instructor. Laboratory registration is done at the time of the course registration. (Fall and Summer I)

114. General Physics II.
Second course of a two-semester sequence suitable for students in the life science. Electricity and magnetism, and optics, electromagnetic waves; modern physics (introduction to relativity, quantum physics, etc.). In addition to the two 75-minute lectures each week, one workshop/recitation each week and one approximately three-hour laboratory every other week are required. Laboratory registration is done at the time of the course registration. Workshop/recitation times are determined by the instructor. (Spring and Summer II)

121. Mechanics.
Course will make extensive use of geometry, algebra and trigonometry and simple integration and differentiation. Prior knowledge of introductory calculus (simple integration and differentiation) is required. First semester of a three-course sequence for students planning to major in physics, other physical sciences, and engineering. Motion in one and two dimensions; Newton’s laws; work and energy; conservation of energy; systems of particles; rotations; oscillations; gravity; thermodynamics. In addition to two 75-minute lectures each week, one workshop/recitation each week and one three-hour laboratory every other week are required. Laboratory registration is done at the same time as the course registration. The workshop/recitation times are determined by the instructor. (Spring and Summer I)

122. Electricity and Magnetism.
Second semester of a three-course sequence for students planning to major in physics, other physical sciences and engineering. Coulomb’s Law through Maxwell’s equations; electrostatics, electrical potential; capacitors; electric fields in matter; current and circuits; magnetostatics; magnetic fields in matter; induction, A.C. circuits; electromagnetic waves. In addition to two 75-minute lectures each week, one workshop/recitation each week and one three-hour laboratory every other week are required. The laboratories registration is at the time of the course registration. Workshop/recitation times are determined by the instructor. (Fall and Summer II)

123. Waves and Modern Physics.
Third semester of a three-course sequence for students planning to majoring in physics, other physical sciences and engineering. Wave motion, physical optics, special relativity, photoelectric effect, Compton effect, X-rays, wave properties of particles. Schrödinger’s equation applied to a particle in a box, penetration of a barrier, the hydrogen atom, the harmonic oscillator, the uncertainty principle, Rutherford scattering, the time-dependent Schrödinger equation and radioactive transitions, many electron atoms and molecules, statistical mechanics and selected topics in solid state physics, nuclear physics, and particle physics. In addition to two 75-minute lectures each week, one workshop/recitation each week and one three-hour laboratory every other week are required. Laboratory registration is at the same time as the course registration. Workshop/recitation times are determined by the instructor. (Spring and Summer II)

141. Mechanics (honors).
First semester of a three-course honors sequence, recommended for prospective departmental concentrators and other science or engineering students with interest in physics and mathematics. Topics studied are similar to those in PHY 121, but are covered in greater depth. These include symmetries, vectors, coordinate and velocity transformations, motion in one and two dimensions, Newton’s Laws, work and energy, conservation of energy and momentum, special relativity, systems of particles, gravity and Kepler’s laws, rotations, oscillations, molecular theory and thermodynamics. In addition to two 75-minute lectures each week, one workshop/recitation each week and one three-hour laboratory every other week are required. The laboratory registration is at the same time as the course registration. The workshop/recitation times are determined by the instuctor.
142. Electricity and Magnetism (honors).
Third semester of a three-course honors sequence (PHY 141, 143, 142), recommended for prospective departmental concentrators and other science or engineering students with a strong interest in physics and mathematics. Topics are the same as those of PHY 123 but in greater depth. These topics include Coulomb’s Law through Maxwell’s equations; electrostatics, electrical potential; capacitors; electric fields in matter; current and circuits; magnetostatics; magnet fields in matter; induction; A.C. circuits; waves. In addition to two 75-minute lectures each week, one workshop/recitation each week and one three-hour laboratory every other week are required. The laboratories registration is at the same time as the course registration. Workshop/recitation times are determined by the instructor.

143. Waves and Modern Physics (honors).
Second semester of a three-course honors sequence, recommended for prospective departmental concentrators and other science or engineering students with a strong interest in physics or mathematics. Topics are the same as PHY 123 but in greater depth. Introductory examinations of Bohr’s atomic model; Broglie waves; momentum and energy quantization; Heisenberg’s uncertainty relation; Schrodinger’s cat; electron spin; photon interference; and Bell’s inequalities; selected applications to solid-state, nuclear, particle, and astrophysics. In addition to two 75-minute lectures each week, one workshop/recitation each week and one three-hour laboratory every other week are required. The laboratories registration is at the same time as the course registration. Workshop/recitation times are determined by the instructor.

181. Mechanics Laboratory.
Laboratories experiments in Mechanics: statistics and measurement; acceleration of gravity; conservation of energy and momentum; moment of inertia and oscillations; and mechanical equivalent of heat.

182. Electromagnetism Laboratory.
Laboratory experiments in electricity and magnetism: Coulomb’s Law; electric fields; measurement of the absolute voltage and capacitance, electricity and magnetism of the electron; superconductivity; and electric circuits.

183. Modern Physics Laboratory.
Laboratory experiments in modern physics: velocity of sound; geometrical optics and imaging; the wave nature of light and microwaves; the spectrum of atomic hydrogen; and the Frank Hertz experiment.

184. Experiments in Electricity, Magnetism, and Modern Physics.
Laboratory experiments in electricity, magnetism, and modern physics: Coulomb’s Law; electric fields; electricity and magnetism ratio of the electron, superconductivity; electric circuits; geometrical optics and imaging; the wave nature of light; and the spectrum of atomic hydrogen.

217. Electricity and Magnetism I.
Review of vector calculus; electrostatic field and potential; boundary value problems solved with orthogonal functions; the multiple expansion and dielectrics; the magnetic field and vector potential.

218. Electricity and Magnetism II.
Electromagnetic induction; displacement current; Maxwell’s equations; the wave equation; plane electromagnetic waves; Poynting vector; reflection and refraction; radiation; waveguides; transmission lines; propagation of light; radiation by charged particles; relativistic formulation of Maxwell’s equations.

227. Thermodynamics and Statistical Mechanics.
Multiplicity of physical states, equilibrium entropy and temperature, Boltzmann factor and partition function, statistical approach to free energy, chemical potential, distribution functions for ideal classical and quantum gases. Applications to chemical reactions, thermal engines, equations of state and phase transitions, applications.

235W. Classical Mechanics I.
Mathematical introduction; review of elementary mechanics; central force problems; conservation theorems and applications; Fourier and Green’s functions; variational calculus and Lagrangian multipliers; Lagrangian and Hamiltonian formulation of mechanics is introduced and applied; oscillations; normal mode theory; rigid body dynamics. The course is designed to satisfy part of the upper-level writing requirement.

Introduction to quantum mechanics with emphasis on applications to physical systems. Includes Schrodinger theory; solutions to the one-dimentional Schrodinger equation; the hydrogen atom; and selected applications from atomic and molecular physics; quantum statistics; lasers; solids; nuclei; and elementary particles.

243W. Advanced Experimental Techniques I.
Students work in pairs and each team is expected to perform three or four experiments from a variety of available setups such as Berry’s phase with light, Universal chaos, lifetime of cosmic ray muons, optical pumping, electron diffraction’s, etc. This is a hands-on laboratory with most experiments under computer control. This course can be used towards satisfying part of the upper-level writing requirement.

244W. Advanced Experimental Techniques II.
A continuation of PHY 243W with greater emphasis on independent research and construction of more complicated instrumentation. This course can be used to satisfy part of the upper-level writing requirement.
245W. The Advanced Nuclear Science Education Laboratory.

The students enrolled in ANSEL will develop a sophisticated understanding of our terrestrial radiation environment and of some of the important applications of nuclear science and technology. They will acquire practical skills in the routine use of radiation detectors, monitors, and electronics, and develop the ability to assess radiation threats and prospects of their abatement. The four in-depth ANSEL experiments are designed to help recreate a type of well-rounded, competent experimental nuclear scientist who is able to analyze an experimental problem, to select, design, and set up appropriate nuclear instrumentation, and to conduct required measurements. The laboratory sessions will meet twice a week for 2 hours and 40 minutes. The students are expected to write detailed lab reports on their work, and give a presentation on of their experiments at the end of the semester. In addition to the laboratory component of ANSEL students will attend a weekly lecture (1 hour and 15 minutes per week).

246. Quantum Theory.

Formalism of quantum theory with more advanced applications than PHY 237. Includes postulates of Quantum Mechanics; function spaces, Hermitian operators, completeness of basis sets; superposition, compatible observables, conservation theorems; operations in abstract vector space, spin and angular momentum matrices; addition of angular momentum; perturbation theory, and simple scattering theory.

250. Advanced Laboratory Project.

Similar in level to PHY 243 and PHY 244, but based on extended experimental projects by students as individuals or in small groups. The projects, chosen by mutual agreement between the students concerned and the professor, are intended to provide experience with the concepts and techniques of modern experimental research work. A particular project may be selected from almost any area of modern physics.

251. Introduction to Condensed Matter Physics.

(Same as MSC 420, ECE 224, 424, PHY 420)

An emphasis on the wide variety of phenomena that form the basis for modern solid state devices. Topics include crystals; lattice vibrations; quantum mechanics of electrons in solids; energy band structure; semiconductors; superconductors; dielectrics; and magnets.

252. Biomedical Ultrasound.

This course provides analyses of the physical bases for the use of high-frequency sound in medicine (diagnosis, therapy, and surgery) and biology. Topics include acoustic interactions of ultrasound with gas bodies (acoustic cavitation and contrast agents), thermal and nonthermal biological effects of ultrasound, ultrasonography, dosimetry, hyperthermia, and lithotripsy.

253. Biological Physics.

The course is designed for students of physical science or engineering background who are interested in biological and medical physics. Topics include fundamentals of biological physics, diffusive motion in biological system, thermal equilibrium and steady state, forces and energetics in biology, biochemical reaction, corporative transitions, biological membranes, neural system, and biophysical techniques. The materials are presented at the level of Nelson Biological Physics.

254. Twentieth-Century Particle Physics.

(Same as PHY 440)

This course is designed for physics majors interested in nuclear and particle physics. The course describes the properties of nuclei and various models used to describe nuclear matter, including the liquid drop model, shell model, collective model, radioactivity, fission, and fusion. Properties of particle interactions with matter are covered and used to describe the principles of detections used in nuclear and particle experiments. In addition, the principle of operation of various existing accelerators is discussed. Finally, the fundamental interactions of elementary particles and their constituents are reviewed, with emphasis on issues pertaining to the conservation of quantum numbers and symmetries observed in high-energy collisions.

255. Introduction to Fluid Dynamics.

(Same as ME 225)

Fluid properties; fluid statics; kinematics of moving fluids; the Bernoulli equation and applications; control volume analysis differential analysis of fluid flow; inviscid flow, plane potential flow; viscous flow, the Navier-Stokes equation; dimensional analysis, similitude; empirical analysis of pipe flows; flow over immersed bodies, boundaries layers, lift and drag.

256. Computational Physics.

Introduction of numerical and computational methods, with special emphasis on their utilities and applications in contemporary physics topics: Intro to programming language, numerical considerations, ordinary differential equations I & II, partial differential equations I & II, analysis of data, random numbers and evaluation, growth and fractal, Monte Carlo method.

261. Interference and Diffraction.

(Same as OPT 261)

Complex representation of waves; propagation of waves, diffraction; scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; partially coherent light; diffraction and image formation; optical transfer function; coherent optical systems, optical data processing, and holography.

262. Electromagnetic Theory.

(Same as OPT 262)

Continuation of PHY 261. Vector analysis; microscopic and macroscopic forms of 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; introduction to quantum optics.
263. Computational Methods in Optics.
(Same as OPT 211)

This course introduces techniques transforming continuous problems to discrete mathematical models. Students learn computational methods for solving problems in optics using high-level software. Includes laboratories.

(Same as OPT 224)

Fundamentals and applications of lasers and laser systems, including optical amplification, cavity design, beam propagation and modulation. Emphasis is placed on developing the basic principles needed to design new systems, as well as an understanding of the operation of those currently in use.

276. Medical Optics.
(Same as OPT 476)

Major topics are biomedical spectroscopy (absorption, fluorescence, Raman, elastic scattering); propagation of photons in highly scattering media (such as tissue); techniques for high-resolution imaging in biological media: confocal imaging, multiphoton imaging, and optical coherence tomography.

311A. Mechanics and Chaotic Dynamics.
(Same as PHY 411)

This course is the same as PHY 411 and offered the first six weeks of the semester to upper-level undergraduates with instructor’s permission. Topics covered are: Lagrangian and Hamiltonian dynamics, canonical transformations, Hamilton-Jacobi equations, chaotic dynamics and routes to chaos, Fourier spectrum and Poincaré maps, Lyapunov exponents, strange attractors and fractal dimensions, information dimension and Kolmogorov entropy, numerical tests for chaotic behavior.

321A. Condensed Matter I.
Credit—2 hours

This course is a 2-credit version of the corresponding graduate-level course PHY 521. The course is offered the first half of the semester and is identical to the first half of the graduate course.

322A. Introduction to Data Acquisition in Physics Laboratory.

No longer being offered; for an equivalent course see PHY 256.

331A. Introduction to Quantum Optics.
(Same as PHY 531, OPT 551)
Credit—2 hours

This is a 2-credit version of the corresponding graduate-level course PHY 531. The course is offered the first half of the semester and is identical to the first half of the graduate course.

354. Cosmology.

Introduction to cosmology, covering the following broad topics: introduction to the universe, introduction to general relativity, cosmological models and the Fridemann-Walker universe, and thermodynamics of the early universe. This course consists of the first half of AST 554/PHY 554.

381A. Particle Physics I.
Credit—2 hours

This course is the first six weeks of the graduate-level course PHY 581. Topics include particle interactions and their symmetries. The particle spectrum and its classification. Calculation of elementary processes. The quark model. CP violation. Accelerators and experimental techniques.

382A. Particle Physics II.
(Same as PHY 582)
Credit—2 hours

This course is offered the first six weeks of the semester. Topics covered are Electroweak theory, and experimental evidence in support of it. Gauge theories and spontaneous symmetry breaking. QCD and color SU(3). Grand unification and recent advances. Particles and cosmology.

386. Teaching Internship I, Pedagogy Training.
(Similar to CAS 352)

This course is designed for an undergraduate planning to be a Workshop Leader Teaching Intern (TI) and can be taken by a Laboratory or Recitation Teaching Intern (TI) who plans to use this experience to fulfill part of the requirements for the Citation for achievement in College Leadership. Typically, the TI attends the weekly Workshop Leader Training meeting that offers specialized support and training in group dynamics, learning theory, and science pedagogy for students facilitating collaborative learning groups for science and social science courses. The TI teaches one workshop, laboratory, or recitation in the fall semester introductory physics courses: PHY 113, PHY 122, PHY 141 or PHY 142, and AST 111. Additional requirements are: Attendance of the weekly content meetings with supervising professor, giving feedback to other leaders in a constructive evaluation process and a project designed in concert with the supervising professor and the PHY 386 instructor.

(Similar to CAS 355)

This course is designed as the second follow-up course for an experienced Workshop Leader, Laboratory or Recitation Teaching Intern who plans to use this experience to fulfill part of the requirements for the Citation for achievement in College Leadership. The TI is expected to attend the weekly Leader Training meeting which offers specialized support and feedback, as well as training/seminars to develop leadership skills, foster ongoing communication among faculty members and TIs, and to provide an environment for review of study group related issues. Students spend the semester teaching one workshop, lab or recitation section during the Spring semester intro physics courses: PHY 114, PHY 121, PHY 123, PHY 143 and AST 142. Additional requirements are: Weekly content meetings with supervising professor, giving feedback to other leaders in a constructive evaluation process and a project designed in concert with the supervising professor and the PHY 387 instructor.
388. Teaching Internship I.  
The student typically spends one or two semesters teaching an introductory physics laboratory section, working with a graduate TA. Faculty supervision is augmented by training, ongoing teaching seminars, and a constructive evaluation process.

389. Teaching Internship II.  
The student typically spends one or two semesters teaching an introductory physics laboratory section, working with a graduate TA. Faculty supervision is augmented by training, ongoing teaching seminars, and a constructive evaluation process.

390. Supervised Teaching.  
(Same as AST 390)  
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.

390A. Supervised Teaching with Leadership Focus.  
This course is designed for an experienced undergraduate planning to be a Workshop Leader, Laboratory or Recitation Teaching Intern (TI), and who is planning to use this experience to fulfill part of the requirements for the Citation for achievement in College Leadership. The TI is expected to attend the weekly Leader Training meetings supporting PHY 386-387. In recognition of their experience, the TI will take on some mentoring and course organizational tasks. Students spend the semester teaching one workshop, laboratory or recitation section during the Fall/Spring semester introductory physics courses: PHY113, PHY114, PHY121, PHY122, PHY123, PHY141, PHY142, PHY143, AST111 & AST142. Additional requirements are: Weekly content meetings with supervising professor and giving feedback to other leaders in a constructive evaluation process. An additional project is required which may or may not coincide with the mentoring and course organizational tasks mentioned above. This course may be taken more than once.

391. Independent Study.  
Independent study project under the direction of a faculty member of the Department of Physics and Astronomy.

393. Senior Project.  
Completion of an independent research project under the direction of a faculty member of the Department of Physics and Astronomy.

393W. Senior Project.  
Completion of an independent research project under the direction of a faculty member of the Department of Physics and Astronomy. This course includes a writing component and can be used to satisfy part of the upper-level writing requirement.

395. Special Topics.  
Independent research project under the direction of a faculty member of the Department of Physics and Astronomy.

395W. Research in Physics.  
Independent research project under the direction of a faculty member of the Department of Physics and Astronomy. This course includes a writing component and can be used to satisfy part of the upper-level writing requirement.

GRADUATE PHYSICS

Many graduate courses in physics are available as 2-credit hour “half-courses” at a level appropriate for undergraduates.

401. Mathematical Methods of Optics and Physics.  
(Same as OPT 411)  
Study of mathematical techniques such as contour integration, transform theory, Fourier transforms, asymptotic expansions, and Green’s functions, as applied to differential, difference, and integral equations. (Prior Titles: Complex Analysis and Differential Equations & Mathematical Methods of Theoretical Optics).

402. Probability.  

404. Linear Spaces.  

405. Geometrical Methods of Physics.  

Finite groups. Compact and non-compact Lie groups and Lie algebras. Group representation theory.

407. Quantum Mechanics I.  

408. Quantum Mechanics II.  
Symmetries including parity, lattice translations, and time reversal. Stationary-state and time-dependent perturbation theory, Stark and Zeeman effects, fine structure, transition probabilities.
Scattering theory with applications. Elementary QED, multipole
and plane-wave expansions, properties of the photon. The Dirac
equation and elementary mass renormalization.

411. Mechanics and Chaotic Dynamics.
Lagrangian and Hamiltonian dynamics, canonical transforma-
tions, Hamilton-Jacobi equations, chaotic dynamics and routes
to chaos, Fourier spectrum and Poincaré maps, Lyapunov ex-
ponents, strange attractors and fractal dimensions, information
dimension and Kolmogorov entropy, numerical tests for chaotic
behavior. (Offered the first 8 weeks as 311A.)

Computational solutions to coupled nonlinear partial differen-
tial equations arising in engineering and physics. Emphasis on
current problems and techniques.

413. Gravitation.
Motivation for a metric theory of gravity, principle of equiva-
ience, principle of general covariance, mathematical tools,
curvature tensor, Einstein field equations and solutions, energy
momentum tensor, weak field approximation. Applications and
optional topics include experimental tests; black holes; relativis-
tic star models; cosmological models; early stages of evolution of
the universe; gravitational waves.

415. Electromagnetic Theory I.
An advanced treatment of electromagnetic phenomena. Electro-
nagnetic wave propagation, radiation, and waveguides and reso-
nant cavities, diffraction, electrodynamic potentials, multipole
expansions, and covariant electrodynamics.

418. Statistical Mechanics.
(Same as CHE 418)
Review of thermodynamics; general principles of statistical
mechanics; microcanonical, canonical, and grand canonical
ensembles; ideal quantum gases; applications to magnetic phe-
nomena, heat capacities, black-body radiation; introduction to
phase transitions.

420. Introduction to Condensed Matter Physics.
An emphasis on the wide variety of phenomena that form the basis
for modern solid state devices. Topics include crystals; lattice vibra-
tions; quantum mechanics of electrons in solids; energy band struc-
ture; semiconductors; superconductors; dielectrics; and magnets.

Basic optical and electronic processes of organic molecules
and polymers. Charge transport and luminescent properties of
organic solids. Metal/organic contacts and charge injection.
Applications in thin-film organic electronic devices including
organic light emitting diodes, solar cells, photoconductors, and
transistors. Review of selected papers.

Nano-optics is an emerging new field of study motivated by the
rapid advance of nanoscience and technology. Traditionally, the
diffraction limit prevents us from optically interacting with matter
on a nanometer scale. In recent years several new approaches have
been put forth to ‘shrink’ the diffraction limit or to even over-
come it. Interaction of light with nanoscale matter renders unique
information about structural and dynamical properties. Optical
techniques are of great importance for the study of biological and
solid-state nanostructures. This course addresses the key issues of
optics on the nanometer scale. Starting with an angular spectrum
representation of optical fields the role of inhomogeneous evanes-
cent fields is discussed. Among the topics are: Theory of strongly
focused light, point spread functions, resolution criteria, confocal
microscopy near-field optical microscopy, and resolution criteria.

434. Quantum Optics Laboratory.
This advanced optics teaching laboratory course will expose
students to cutting-edge photon counting instrumentation and
methods with applications ranging from quantum information
to biotechnology and medicine. It will be based on quantum
information, the new, exciting application of photon counting
instrumentation. As much as wireless communication has im-
pacted daily life already, the abstract theory of quantum mechani-
ces promises solutions to a series of problems with similar impact
on the twenty-first century. Major topics will be entanglement
and Bell’s inequalities, single-photon interference, single-emitter
confocal fluorescence microscopy, Hanbury Brown and Twiss
correlations/photon antibunching. Photonic based quantum
computing and quantum cryptography will be outlined in the
course manuals as possible applications of these concepts and
tools. The full course will consist of four laboratory experiments
and a special final meeting of students oral presentations.

Topics include quantum mechanical treatments to two-level
atomic systems, optical gain, homogeneous and inhomogeneous
broadening, laser resonators, cavity design, pumping schemes,
radiation equations, Q-switching for various lasers.

Credit—2 hours
This course covers the basic theory and experimental practice
of spectroscopy in molecules and condensed matter. A general
review of electromagnetic waves is followed by time dependent
perturbation theory and a density matrix treatment of two-level
systems. The basic principles are applied electronic, vibrational
and rotational spectroscopy. The course draws heavily on litera-
ture studies that exemplify the material.

437. Nonlinear Optics.
(Same as OPT 467)
Fundamentals and applications of optical systems based on the
nonlinear interaction of light with matter. Topics to be treated
include mechanisms of optical nonlinearity, second-harmonic
and sum and difference-frequency generation, photonics and optical logic, optical self-action effects including self-focusing and optical soliton formation, optical phase conjugation, stimulated Brillouin and stimulated Raman scattering, and selection criteria of nonlinear optical materials.

438. Optical Communications Systems.  
(Same as OPT 428)  
The course is designed to give the student a basic understanding of the optical communications systems while making one aware of the recent technological advances. The following topics are covered: components of an optical communication system, propagation characteristics of optical fibers, light wave sources such as light-emitting diodes and semiconductor lasers, optical receivers, noise analysis and bit error rate, coherent, multichannel, and solution-based communication systems.

(Same as OPT 459, CHM 459)  
This course will cover a broad range of optical spectroscopic techniques and will focus on theoretical methods for their microscopic interpretation. A general correlation function methodology for analyzing nonlinear optic experiments in terms of molecular dynamics and relaxation processes will be developed. The relationships among ultrafast (time-domain) and frequency-domain techniques will be discussed. Applications will be made to fluorescence and Raman spectroscopy, three and four wave mixing, photon echo, hole burning and transient gratings in the gas phase and condensed phases. Optical materials and nanostructures will be discussed.

440. Twentieth-Century Particle Physics.  
(Same as PHY 254)  
This course is designed for physics majors interested in the development of nuclear and particle physics. The course describes the properties of nuclei and various models useful for the description of nuclear properties. The models and ideas include the liquid drop model, shell model, collective model, radioactivity, fission, and fusion. Properties of particle interactions with matter are covered, and used to develop principles of detectors used in nuclear and particle experiments. The physical ideas behind various existing accelerators are discussed. Finally, the fundamental interactions of elementary particles and their constituents are reviewed, with emphasis on issues pertaining to the conservation of quantum numbers and symmetries observed in the high-energy collisions.

445. Advanced Nuclear Science Education Laboratory.  
The students enrolled in ANSEL will develop a sophisticated understanding of our terrestrial radiation environment and of some of the important applications of nuclear science and technology. They will acquire practical skills in the routine use of radiation detectors, monitors, and electronics, and develop the ability to assess radiation threats and prospects of their abatement. The four in-depth ANSEL experiments are designed to help recreate a type of well-rounded, competent experimental nuclear scientist who is able to analyze an experimental problem, to select, design, and set up appropriate nuclear instrumentation, and to conduct required measurements. The laboratory sessions will meet twice a week for 2 hours and 40 minutes. The students are expected to write detailed lab reports on their work, and give a presentation on of their experiments at the end of the semester. In addition to the laboratory component of ANSEL students will attend a weekly lecture (1 hour and 15 minutes per week).

446. Nuclear Science and Technology I.  
(Formerly CHM 466) Nuclear technologies of measurement, accelerators and radiation detection, effects and applications of radiation. Fundamental particles interactions, quark model. Nuclear masses, sizes, and shapes. Overview of microscopic and macroscopic models of the nucleus. Nuclear radioactivity and decay modes. Introduction to nuclear reaction theory, classical potential scattering, semi-classical and quantal models of scattering, nuclear excitation, and mass transfer. Mathcad computer projects. Two 75-minute lectures per week, home work problems, and computer simulations.

451. Physics of Astrophysics I.  
One-half of the required two-part sequence (can be taken before or after AST 462). Focuses on the physics of radiation production by ionized and atomic matter, the transfer of radiation through matter, and what we measure from astrophysical objects. Concepts are developed from first principles and many applications in astrophysics are studied.

452. Physics of Astrophysics II.  
(Same as AST 462)  
Continuation of PHY 451.

454. Introduction to Plasma Physics.  
(Same as ME 434)  
Orbit theory, adiabatic invariants, collective effects, two-fluid and MHD equations, waves in plasma, transport across magnetic fields and in velocity space.

455. Introduction to Plasma Physics II.  
Vlasov equation, Landau damping, VanKampen modes, two-stream instability, micro-instabilities, introduction to kinetic theory, shield clouds, Thomson scattering, and the Fokker-Planck equation.

(Same as ME 436)  
Acoustics; linearized equations for homogeneous media; mathematical theory of linear waves; waves in stratified atmospheres; geometrical acoustics. Finite amplitude compressible flow; one-dimensional waves and the theory of characteristics; shock waves; steady two-dimensional flow. Radiative transfer; emission and absorption in gases; equation of radiative transfer; radiative effects on waves.
457. Incompressible Flow.
Kinematics, the Navier-Stokes equation, the stream function, vorticity dynamics, laminar viscous flows, slow viscous flow, boundary layers, inviscid irrotational flow.

462. 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, reconstruction algorithms of X-ray and ultrasonic-computed tomography, and MRI.

464. Biological Physics.
(Same as PHY 253)
Physical aspects of special topics in biology. The purpose of this course is to survey several important areas of biological and medical physics. Topics covered include properties of biological membranes, transport and signaling in cells and tissue, photosynthesis, magnetic resonance imaging, and physical methods in biology such as nuclear magnetic resonance, x-ray diffraction, and optical absorption and fluorescence spectroscopies. The material is presented at the level of Russeu K. Hobic’s, Intermediate Physics for Medicine and Biology.

475. Particle Physics.
Prerequisite: permission of instructor.
The department hosts the PARTICLE (Physics and Rochester Teachers Inventing Classroom Experiments) program. Students (high school teachers) study the methods and techniques of experimental particle physics research by participating in the design and construction of detectors for classroom-based cosmic ray experiments.

491. Master’s Readings in Physics.
Special study or work, arranged individually for master’s candidates.

After serving as a lead Teaching Assistant (TA), the student teaches a course during the University’s summer session. Students successfully completing the Graduate Teaching program are awarded a Certificate of College Teaching in Physics and Astronomy to be presented during the graduation ceremony in May.

498. Supervised Teaching Assistant I.
Credit—none
This course is designed for a student to be Laboratory or Recitation Teaching Assistant (TA). Typically, the student spends the semester teaching two laboratories or up to four recitations during the Fall semester for the introductory physics courses: PHY 113, PHY 122, PHY 141, PHY 142, or introductory astronomy course: AST 111, or teaching one or more recitation(s): AST 111, PHY 113, PHY 122, PHY 141, PHY 142, or a 200-level undergraduate physics or astronomy course. Attendance at the weekly teaching seminars (PHY 597, Fall), giving feedback to other leaders, and a constructive evaluation process are required. This course may be taken more than once.

509. Introduction to Nonrelativistic Many-Body Systems.
The basic concepts and techniques of many-body systems and how they are used to extract their physical properties. Techniques to be covered are second quantization, Green’s functions, linear response theory, perturbative expansions based on Feynman diagrams, variational methods, and functional methods. Electron gas and other normal Fermi systems, superconductivity, interacting Bose systems and condensation, quantum magnetic systems, localization, etc.

510. Advanced Quantum Mechanics.
Review of Dirac equation, covariance and transformation properties of the Dirac equation, propagator theory, applications, second order corrections and renormalization, Klein Gordon equation, non-electromagnetic interactions.

511. Field Theory.
Path integral formulation of quantum mechanics, free harmonic oscillator, fermionic oscillator, instantons, free scalar field, Green’s functions, generating functional statistical mechanics as Euclidean field theory, partition function as a path integral, free Bose gas, interacting theories, Green’s functions and scattering amplitudes at tree level, symmetry, Ward identities, symmetry breaking and Goldstone theorem, effective action at one loop, 1d Ising model, 2d Ising model, duality, high and low temperature expansions, transfer matrix, scaling of coupling with lattice size.

512. Renormalization.
Background and introduction to renormalization, one loop divergences in perturbation theory, and Callan Symanzik equation. The Renormalization group and Wilson’s point of view, effective actions, and operator product expansion.

(Same as BCS 513).

516. Electromagnetic Theory II.
A continuation of PHY 415 covering special relativity, radiation from moving charges, radiation damping, scattering and electrodynamics in material media.

519. Statistical Mechanics II.
A continuation of PHY 418, involving the theory of imperfect gases, phase transition, and Brownian motion.
521. Condensed Matter I.  
(Same as MSC 550)
Classification of solids by crystal lattice, electronic band structure, phonons, and optical properties; X-ray diffraction, neutron scattering, and electron screening.

522. Condensed Matter Physics II.  
(Same as MSC 551)
Electron-phonon interaction, transport, magnetism, and topics of current interest such as superconductivity or localization, to be determined by the instructor.

523. Solid-State Quantum Optics.  
Subject matter to be selected by the instructor from among topics of current interest in solid state.

527. Introduction to Computational Neuroscience.  
(Same as BCS 547)
Computational Neuroscience in Physics.

531. Introduction to Quantum Optics.  
(Same as OPT 551)
Classical and quantum mechanical theories of the interaction of light with atoms and molecules, with emphasis on near resonance effects, including coherent nonlinear atomic response theory, relaxation and saturation, laser theory, optical pulse propagation, dressed atom-radiation states, and multi-photon processes.

532. Quantum Optics of the Electromagnetic Field.  
Properties of the free quantized electromagnetic field, quantum theory of coherence, squeezed states, theory of photoelectric detection, correlation measurements, atomic resonance fluorescence, cooperative effects, quantum effects in nonlinear optics.

533. Quantum Optics of the Atom-Field Interaction.  
(Same as OPT 553)
Subject matter to be selected from topics of current interest in quantum optics.

534. Mechanical Effects in the Atom-Field Interaction.  
(Same as OPT 554)
Subject matter to be selected from topics of current interest in quantum optics.

535. Modern Coherence Theory.  
(Same as OPT 592)
Theory of random process, stationarity ergodicity, the auto-correlation function and the cross-correlation function of random process. Spectrum of a stationary random process and the Wiener-Khinchine theorem, Second-order coherence theory in the space-time domain, the mutual coherence function, the degree of coherence. Second-order coherence theory in the space-frequency domain, the cross spectral density, mode representation, propagation problems. Inverse radiation problems, effects of source correlations and scattering of partially coherent light from deterministic and from random media.

537. Statistical Optics.

539. Waveguide Optoelectronic Devices.  
(Same as OPT 568)
This course examines in detail principles of operation of modern optoelectronic devices with an emphasis on waveguide devices. Topics generally include dielectric optical waveguides, coupled-mode theory, passive components, electro-optic devices, semiconductor lasers, semiconductor optoelectronic devices, and fiber lasers and amplifiers.

541. Nuclear Structure I.
Nuclear models and symmetries in nuclei; shell model, models pertinent in regions of strong pairing interactions, including BCS and generalized seniority; the microscopic theory of vibrations; rotational structures in heavy and light nuclei.

542. Nuclear Structure II.
Electromagnetic and weak transitions; sum rules, introduction to nuclear reactions, theory of nuclear forces.

546. Nuclear Science and Technology II.  
(Same as CHM 566)
Experimental and theoretical studies of heavy-ion scattering and reaction mechanisms; semi-classical and quantal scattering theory; Coulomb excitation; few-nucleon transfer; damped heavy-ion reactions; fusion and fission processes; statistical approaches to complex nuclear reaction mechanisms.

552. Magnetohydrodynamics.
Basic equations of magnetohydrodynamics (MHD). The induction equation and kinematic MHD. Magnetohydrostatic equilibria and stability. MHD waves. Behavior of magnetic flux tubes. Viscous MHD flows. Dynamo theory. Selected applications, such as electromagnetic pumps and flowmeters, sunspots, the and the solar dynamo.
**553. Laser-Plasma Interactions.**


**554. Cosmology.**

*(Same as AST 554)*

Introduction to cosmology, covering the following broad topics: Introduction to the universe, introduction to general relativity, cosmological models and Fridemann-Walker universe, thermodynamics of early universe, particle physics of the early universe, and the formation of large-scale structure.

**556. Hydrodynamic Stability and Turbulence.**


**557. Plasma Stability.**

*(Same as ME 534)*

Stability of magnetically confined plasma, delta-W formalism, double adiabatic equation, comparison theorem, shear stabilization, minimum-beta fields, resistive instabilities, Tokamak and Mirror stability theory.

**558. Inertial Confinement Fusion.**

*(Same as ME 533)*


**564. High-Energy Astrophysics.**

*(Same as AST 564)*

A survey of current research topics in high energy astrophysics, Topics drawn from X-ray and gamma-ray astrophysics, supernovae and planetary nebulae, binary accretors, astrophysics of compact objects (black holes, neutron stars, white dwarfs), plasma astrophysics, magnetic field-particle interactions, cosmic rays, astrophysical jets, active galactic nuclei.

**581. Particle Physics I.**

Particle interactions the their symmetries. The particle spectrum and its classification. Calculation of elementary processes. The quark model. CP violation. Accelerators and experimental techniques.

**582. Particle Physics II.**

Electroweak theory, and experimental evidence in support of it. Gauge theories and spontaneous symmetry breaking. QCD and color SU(3). Grand unification and recent advances. Particles and cosmology.

**591. PhD Readings in Physics.**

Special study or work, arranged individually.

**597. Teaching and Research Seminar.**

*Credit—none*

Course is given once per week, required of all first-year graduate students. The seminar consists of lectures and discussions on various aspects of being an effective teaching assistant, including interactions with undergraduate student body and cross-cultural issues. (Fall and Spring.)

**598. Teaching Workshop Leader Pedagogy Training.**

*Credit—none*

This course is designed for students Planning to be Workshop Leader Teaching Assistants (TAs). Typically, the TAs attend the weekly Workshop Leader Training meeting that offers specialized support and training in group dynamics, learning theory, and science pedagogy for students facilitating collaborative learning groups for science and social science courses. The TAs teach three to four workshops in one of the fall semester introductory physics courses: PHY 113, PHY 122, PHY 141, or PHY 142. Additional requirements are attendance at the weekly Graduate Teaching Seminars (PHY597, Fall), giving feedback to other leaders and a constructive evaluation process. This course may be taken more than once.

**599. Pedagogy and Group Leadership.**

*Credit—none*

This course is designed as a follow-up course for an experienced Workshop Leader, titled a lead Workshop Leader Teaching Assistant (TA). Typically, the TA attends the weekly Workshop Leader Training meeting that offers specialized support and training to develop leadership skills, to foster ongoing communication among faculty members and study group leaders, and to provide an environment for review of study group related issues. Students spend the semester teaching three to four workshops during the spring semester introductory physics courses.

**UNDERGRADUATE ASTRONOMY**

**102. Black Holes, Time Warps, and the Large Scale Structure of the Universe.**

A physical and astronomical (but non-mathematical) picture of the workings of Einstein’s theories of relativity, and their application to cosmology and to black holes and wormholes, the most exotic and energetic objects known to scientists. Our aims in this course are two: to demystify black holes, big-bang cosmology, and the nature of space and time for non-science majors, in order that they may evaluate critically the frequent references to these esoteric concepts in the press and in popular science and science-fiction literature; and to provide non-science majors with a glimpse of the processes by which scientific theories are conceived and advanced.
104. Solar System.
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.

105. The Milky Way Galaxy.
In this course we introduce students to our home galaxy, the Milky Way, and use the structure and contents of this normal galaxy to illustrate the origins of stars like the Sun, the origins of the chemical elements from which we are formed, and the evolution of galaxies through the life of the Universe. The emphasis in the presentation is on the descriptive astronomy and the physical principles describing the operation of the various celestial objects, with a minimum of mathematical detail. Note: AST 102, 104, 105 are offered in a three-semester rotation.

106. Cosmic Origins of Life.
A review of the evidence for habitats and the building blocks of life in extraterrestrial space, the possibilities for the development of life elsewhere, and the light that these ideas cast on the origins of life on Earth. We also discuss the future of civilizations like ours, the possibilities of travel to other habitable planets and communication between advanced cultures spread widely through space. The material we discuss will be drawn very widely from astronomy, physics, geology, chemistry and biology, presented with a minimum of mathematical complexity (Spring and Summer I)

111. The Solar System and Its Origin.
A study of the structure and composition of the individual planets and smaller solar-system bodies, the orbital dynamics and overall structure of the Solar system and its contents, and the formation of planetary systems like ours. Designed for freshmen who intend to major in science or engineering, the course involves the use of ideas learned in mathematics and physics courses taken concurrently or in high school, such as single-variable calculus, Newton’s laws of motion and gravity, and the ideal-gas law. The course also includes a night-time observing project, based upon student use of professional-style telescopes and CCD cameras.

142. Elementary Astrophysics.
Application of the physics and math techniques learned in the introductory course sequences, to the study of celestial objects outside the Solar system. We discuss stars and their formation from interstellar matter, the structure of galaxies and their distribution in the Universe, and the origins and large-scale structure of the Universe; all topics that are developed much further in the AST 200-level courses. The course also includes a night-time observing project, based upon student use of professional-style telescopes and CCD cameras.

Introduction to special and general relativity with applications to astrophysics and cosmology. A thorough study of special relativity & then on general relativity. The discussion of the latter begins with the connection between geometry and physics, the equivalence principle, and presentation of the metrics—the solutions to the Einstein field equation—for simple geometries. We will discuss first the spherically-symmetric (Schwarzschild) solution as an introduction to spacetime warping in strong and weak gravity; the basic physics of orbits around black holes; the connection of black holes and accretion disks; use the emergent concepts to understand astronomical objects that contain BH-accretion disk combinations, such as X-ray binaries and active galactic nuclei. Discussion on the effect of black hole rotation on the metric. Gravitational lensing will be introduced; homogeneous & isotropic (Roberts-Walker) solution, and apply this metric cosmology and the large-scale structure of the universe.

232W. The Milky Way Galaxy.
Class focuses on our home galaxy and all that’s in it. After a review of some aspects of fundamental astrophysics, students learn about the Interstellar Medium (ISM) and its life cycle, the role of stars and stellar evolution in determining the characteristics of the ISM, star formation, stellar death, supernova, planetary nebulae, galactic structure, galactic kinematics, spiral wave theory, and the galactic center. This course may be used towards satisfying the upper-level writing requirement.

241. Astrophysics I.
This introduction to the physics of stars is taken primarily by juniors and seniors majoring in physics and astronomy, physics, optics, or mathematics. The elements of radiative transfer and gas dynamics are presented and applied to the study of the atmospheres of stars. The interior structure and evolution of stars of various types are also discussed.

242. Astrophysics II.
This introduction to the physical processes in astronomical objects is taken primarily by juniors and seniors majoring in physics, physics and astronomy, optics, or mathematics. Topics discussed include physical processes in the interstellar medium; star formation and molecular clouds; the structure of galaxies; and interaction to cosmology.

391. Independent Study.
Normally open to seniors concentrating in physics and astronomy. Independent study project under the direction of a faculty member of the Department of Physics and Astronomy.

391W. Independent Study.
Normally open to seniors concentrating in physics and astronomy. Independent study project under the direction of a faculty member of the Department of Physics and Astronomy. This course can be used towards satisfying the upper-level writing requirement.
393. Senior Project.
Completion of an independent research project under the direction of a faculty member of the Department of Physics and Astronomy.

393W. Senior Thesis.
Completion of an independent research project under the direction of a faculty member of the Department of Physics and Astronomy. This course includes a writing component and can be used to satisfy part of the upper-level writing requirement.

395. Special Topics.
Completion of an independent research project under the direction of a faculty member.

GRADUATE ASTRONOMY

The following graduate courses are open to advanced undergraduates with permission of the instructor.

403. Experimental Techniques in Astronomy.
This course is an introduction to the tools of modern observation astronomy. We discuss geometrical and physical optics applied to telescopes and astronomical cameras; the physics of light detection at radio, infrared, visible, X-ray, and X-ray wavelengths; and the instruments and techniques used for observations of faint celestial objects over the full useful range of spectral and angular resolution. The intention is to provide to students the preparation necessary to design, build and optimize astronomical instruments. However, the material should be useful to anyone who will be using remote-sensing instruments, astronomical or otherwise, or is seeking to understand measurements made with these devices.

450. Stellar Atmospheres.

453. Introduction to Stellar Interiors and Atmospheres.
A first course on stellar interiors and atmospheres in which approximately 50 percent of a semester is devoted to each. Stellar Interiors topics cover hydrostatic equilibrium, the Virial theorem, energy generation and transport, overview of stellar evolution, PMS Evolution, main sequence evolution, late evolution, evolution in close binary systems, stellar modelling (in part), the approach to real models. Stellar Atmospheres topics cover basic Radiative Transphere, transport Equation, Eddington-Barbier approximation, line and continuum transfer in LTE, radiative transfer in static Plane-Parallel stars, exponential integrals and the Schwarzchild-Milne equations, Lambda, Phi and Chi operators, various Eddington approximations, Atmospheres of Static Plane-Parallel Stars, pressure stratification, temperature stratification, radiative equilibrium, Gray-atmosphere approximation, spectra from static Plane-Parallel stars, line broadening mechanisms, spectral line formation. See AST 450 & AST 553 for full-fledged courses.

455. Astronomical Interferometry.
This course is an introduction to the principal technique of modern radio astronomy, and an increasingly important tool for infrared and visible wavelengths: spatial interferometry. We discuss the elements of physical optics, coherence theory, and the physics of detectors and receivers that bear on astronomical interferometry. We follow this formal development with a detailed account of the practice of interferometry, calibration, and data reduction. The intention is to provide to students all they need to know to understand, plan, propose, and analyze observations with such instruments as the Very Large Array (VLA), the Very Long Baseline Array (VLBA), the Owens Valley Radio Observatory’s (OVRO) Millimeter Array, and the Berkeley-Illinois-Maryland Array (BIMA) at Hat Creek Radio Observatory.

461. Physics of Astrophysics I.
(Same as PHY 451)
One-half of the required 2 part sequence (can be taken before or after AST 462). Focuses on the physics of radiation production by ionized and atomic matter, the transfer of radiation through matter, and what we measure from astrophysical objects. Concepts are developed from first principles and many applications in astrophysics are studied.

462. Physics of Astrophysics II.
(Same as PHY 452)
One-half of the required 2 part sequence (can be taken before or after AST 461). Focuses on hydrodynamic and plasma processes relevant to astrophysics. Fundamentals of fluid dynamics and magnetohydrodynamics, fluid, MHD, and thermal instabilities, turbulence, supersonic and subsonic flow. Accretion physics, shocks, dynamos, particle accelerations in plasmas, dynamics of magnetic fields. Concepts are developed from first principles and many applications in astrophysics are studied.

Star, gas, and dust distribution in our galaxy. Structure studies and classification of other galaxies. Clusters of galaxies, red shifts, Seyfert galaxies, peculiar galaxies, quasars.

551. Diffuse Matter in Space.

552. Galactic Dynamics.
Boltzmann equation and collision theory. Structure and evolution of clusters, numerical experiments, Galactic hydrodynamics, wave theory of spiral arms, models of galactic nucleus regions, superdense cluster theory.
553. Stellar Interiors.

554. Cosmology.
(Same as PHY 554)
Introduction to cosmology, covering the following broad topics: Introduction to the universe, introduction to general relativity, cosmological models and the Friedmann-Walker universe, thermodynamics of the early universe, particle physics of the early universe, and the formation of large-scale structure.

A survey of current research reports in scientific journals on topics including research on pulsars, quasars, and radio and infrared observations of the interstellar medium.

564. High-Energy Astrophysics.
(Same as PHY 564)
A survey of current research in high energy astrophysics. Topics drawn from X-ray and gamma x-ray astrophysics, supernovae and planetary nebulae, binary accretors, astrophysics of compact objects (black holes, neutron stars, white dwarfs, plasma astrophysics, magnetic field-particle interactions, cosmic rays, astrophysical jets, active galactic nuclei.

Survey of theory and multi-wavelength observations related to the formation of early evolution of stars and planets. Interstellar medium, interstellar dust, molecular clouds, protostars, T Tauri stars, circumstellar disks, pre-main sequence stellar evolution, extrasolar planets and substellar objects, constraints on the protosolar nebula from meteorites and the planets.

570. Solar System Dynamics.

Polish and Central European Studies

Polish and Central European Studies provides students with an opportunity to develop an interdisciplinary knowledge of Polish and Central European politics, history, cultures, and international relations with Eastern (Russia/Soviet Union/Post–Soviet States) and Western Europe, as well as with the United States.

Course offerings include courses taught by the College faculty as well as by visiting scholars from Poland and Central Europe. Some of the course offerings are taught at the Jagielonian University in Krakow. It is strongly recommended that those interested in developing their knowledge of this region participate in one of the University of Rochester–sponsored, one-semester study abroad programs in Poland or Central Europe. Students interested in the certificate should contact the Multidisciplinary Studies Center.

Those planning to study in Poland should inquire at the Skalny Center for Polish and Central European Studies about Skalny Scholarships.

Requirements
The Polish and Central European Certificate Program provides students with an opportunity to develop an interdisciplinary knowledge about Poland and Central Europe. Interested students should put together a list of 10 courses (or 40 credit hours) with the following departmental distribution:

- Six courses from the primary list:
  Four must be in social sciences (political science, economics, or history)
  Two must be in languages (any western Slavic language, Romanian, Hungarian, or Yiddish) or cultures (anthropology, art, film studies, music, philosophy, theater, or religion)
- Four additional courses from either the primary or secondary list. Substitutes for these courses may be approved by the students’ PCE studies director. Up to two substitute courses may be foreign language courses above the 105 level.
- Courses transferred from another college must be approved by the students’ PCE studies director. 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 certificate. Upon graduation, students successfully completing the PCE studies program receive a Certificate in Polish and Central European Studies.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**PRIMARY COURSES**

**History and Political Science**

**116. Introduction to History of Poland.**

The aim of this course is to present a general outline of the cultural, political, as well as social and economic history of Poland in the context of Europe. The complexity of a thousand years of Polish history will be presented in an accessible way. We will also explore the themes of European historical diversity and European identity in the context of Poland.

**119. The Relativity Revolution.**

This course will attempt to place Einstein in the context of the German history of his times (as the course dealing with Newton attempts to place him in the England of his times). Einstein caused a revolution in physics in 1905 and following years, which altered the conceptions that had endured since 1678 (Newton). An attempt will also be made to explain Einstein’s most famous results in accessible language without requiring any advanced mathematics or physics.

**205. Europe Since 1945.**

What is Europe? Is it a definition of a geographical area, an economic entity, or is it a cultural formation? This course will examine both the historical development of European integration and more contemporary debates about the formation of the European Union. With an overview of both world wars and their impacts on European civilization and state system, the course will focus on the stages of European integration from the post-World War II period until now. With an introduction to the composition and role of the institutions in the EU system, its interaction with the national politics will be explored. Contemporary debates on the idea and exercise of the cultural integration of Europe will be paid special attention with comments on the European Union’s expansion and future.

**206. The Holocaust.**

THE EVENT: Jews in Nazi Germany; the concentration camp; the Nazi ghetto; the death camps; uprising and resistance. ANTECEDENTS: The historical development of Anti-Semitism and the nature of totalitarianism; German political and cultural history of the 19th-20th centuries; the place of the Jewish minority in Europe. MEANING: Survival in theology, literature, and politics; theological and historical interpretations of the Holocaust; the problem of evil.

**241. Politics of Identity.**

This course examines how culture, ethnicity, and politics intersect in 20th-century Russian literature. We begin with excerpts from Dostoevsky’s *Diary of a Writer*, sacralizing Russianness and demonizing Jews. Political and artistic avant-gardes 1900-1930 are analyzed for their attempts to overcome traditional ethnic divisions. In Stalin’s Russia an international Soviet identity was replaced by a Russian state culture, which put “cosmopolitanism” on trial after World War II. A secular Russian cultural identity was the norm until the state withdrew from the cultural sphere in the late 1980s, but Russian Jewish emigre literature was available to many readers through unofficial channels. We end with the battle of competing identities in post-1985 Russia. Readings include Dostoevsky, Babel, Grossman, Mandelstam, Pasternak, Roziner, Tertz, Markish, Rasputin, and Brodsky. In English.

**301W. History of Race in Europe.**

**History Seminar**

**106. Introduction to International Relations.**

Introduces students to the wide range of issues that make up the study of international relations, including the workings of the state system, the causes of international conflict and violence, and international economic relations.

**251. New Nationalisms: East and West.**

Taking the post-communist decades as a point of departure, this course explores the roots and fates of different varieties of nationalism in Central Europe.

**255. Political Films.**

Examines film as the dominant form of political expression under state patronage, with examples from the Soviet Union, Nazi Germany, and, after World War II, from Poland, Hungary, Czechoslovakia, and the former Yugoslavia.

**256. Theories of Comparative Politics.**

Introduces theories in the field of comparative politics. Leads to understanding how the national and international environment, the political culture, the political institutions and the choices of citizens and leaders affect political performance. Explains democratization, stability, competition, citizen influence, and policy outcomes as consequences of the environment, culture and institutions--and human choices in these contexts.

**262. Globalization Past and Present.**

Examines the implications of economic globalization for domestic and international politics.
269. **Russian Politics.**

Focuses on the politics of the Russian Federation in the post-Soviet period. After a brief review of the decline and fall of the USSR, it will concentrate on Russian political development under the presidencies of Boris Yeltsin, Vladimir Putin, and Dmitry Medvedev.

272. **Theories of International Relations.**

How do we explain patterns of war and peace? Why do states with common interests often fail to cooperate? This course surveys theories of international relations, focusing on explanations of conflict and cooperation.

274. **Introduction to International Political Economy.**

Explores the interaction between politics and economics at the international level as well as between the international and domestic levels, involving various actors such as governments, interest groups, and multinational corporations.

**Languages and Cultures**

101. **Elementary Polish I.**

Introduction to modern Polish and basic vocabulary.

102. **Elementary Polish II.**

Continuation of POL 101.

107. **Polish in Poland.**

151. **Intermediate Polish.**

Designed for students returning from a semester in Poland and/or have completed Pol 101 and 102. Uses intermediate//advanced book W Labiryncie, adapted Polish soap opera. Reading and learning dialogues, review of grammar and stress on contemporary active language. Students will view feature films in Polish and write/correct a composition on the films in Polish.

289. **Dangerous Texts.**

When modern Russian literature began to evolve in the mid-1600s, the printed or written text was immediately seen as a potential danger to the power of Church and State. In this course, we will examine dangerous texts from the 17th century to the present to see what aspects of texts and their authors were seen as threats and how these threats were dealt with. We will also see the ways in which writers did indeed perceive themselves as a second government and how this changed the way they wrote. The reading list will include works by: Avvakum, Radishchev, Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, Babel, Mayakovsky, Mandelstam, Pasternak, Yevtushenko, Solzhenitsyn, Voinovich, Grossman, and Sinyavsky/Tertz. The goal of this course is to arrive at an understanding of the unique role played by literature in Russian history. In English.

**Primary Courses Offered Occasionally by Visiting Faculty**

254. **Political Economy of Europe.**

Examines the European Monetary Union, the Lisbon Strategy, and the challenges facing new entrants, with an eye toward analyzing the state of European integration.

256. **Theories of Comparative Politics.**

Introduces theories in the field of comparative politics. Leads to understanding how the national and international environment, the political culture, the political institutions and the choices of citizens and leaders affect political performance. Explains democratization, stability, competition, citizen influence, and policy outcomes as consequences of the environment, culture and institutions—and human choices in these contexts.

257. **Poland and the New Europe.**

Introduces Poland’s modern history: from the downfall of the Polish-Lithuanian Commonwealth at the end of the 18th century through the rise in recent years of an independent, democratic state.

355. **Joseph Conrad.**

Examine major novels and short stories by Joseph Conrad. Draw general conclusions about Conrad’s entire literary output. Some film screenings outside of class time.

**SECONDARY COURSES**

100. **Gateway to History.**

An introduction to historical research and inquiry for prospective and new history majors. Each section of this course will be organized around a particular theme.

117. **History of Islam.**

This course will trace 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.

150. **Russian Civilization.**

Russian civilization from its beginnings a thousand years ago to the present day. Each unit covers historical and cultural background as well as literary texts. National “myths” that govern the Russians’ understanding of their history and culture are examined. Traditional tensions in Russian civilization which prevail today, such as those between chaos and order, foreign influence and a strong national identity, innovation and tradition, and between radical skepticism and faith, are analyzed. Readings include Russian fairy tales and saints’ lives, excerpts from the autobiography of the 17th c. heretic Avvakum, tales by Pushkin and Gogol, one of Dostoevsky’s most powerful and influential novels (Devils: The Possessed), and a wide range of materials from the 20th c.
151. Imperial Russia.
This course examines the history of the Russian Empire from the reign of Peter the Great (1692-1725) to the revolutions of 1917. Students will read primary sources in translation, academic articles, and a survey text. About one-half of class time will be devoted to discussion of the readings. Topics will include Peter’s westernization of Russian elites and the costs thereof, the Pugachev rebellion of 1773-1775, the spread of Enlightenment ideals to Russia during the Napoleonic Wars, the abolition of serfdom, Sergei Witte’s industrialization drive, socialist movements in Russia, World War I, and the causes of the revolutions of 1917.

152. Soviet Russia.
This class examines the history of the Soviet Union from foundation (1917) to collapse (1991), focusing on internal developments in the Russian part of the Union. We will begin with a discussion of the background to the collapse of the imperial Russian state in 1917, including changes in Russian society and World War I. Later, the class will look at questions such as: Did the New Economic Policy of the 1920s create a stable socioeconomic order? How did Stalin defeat his political rivals and create a personal dictatorship? What were the motivations for the Great Terror of 1937-1938? How did the Soviet Union defeat Nazi Germany in World War II? We will also devote some time to the Soviet role in the Cold War and the appeal of Leninism in colonized and post-colonial societies. The course will conclude with a discussion of the collapse of the USSR and the emergence of a soft authoritarian order in post-Soviet Russia. The syllabus will emphasize primary-source readings and class discussion.

153. Russia Now.
Credit—2 hours
Students will follow current events in Russia through the internet, newspapers, magazines, and other sources (including satellite broadcasts when available). Along with a general attention to current events, each student will follow a particular area of interest (e.g. national identity, the market economy, politics, health issues, crime, culture, foreign policy) throughout the term, do background work on this topic and write it up towards the end of the term. Students who read Russian will be encouraged to use available sources in that language. This course is designed to (1) familiarize students with the most important issues facing Russia today and the historical/political/cultural context in which to place them; (2) to acquaint students with a variety of resources from the US, Russia, and a number of other countries and the different perspectives these sources may give on one and the same issue. Course may be taken more than once for credit.

224. Russian Art.
The history of Russian art and architecture from the Christianization of Russia through the twentieth century. Students learn how to read icons, discern the major features of Russian churches, and follow the development of Russian painting from the age of realism to modern times. In English.

101. Introduction to Comparative Politics.
Introduces the study of political science and comparative politics. Focuses on how citizens may be able to control public policies in different modern democracies.

350. Comparative Politics Field Seminar.
Provides general conceptual background and an introduction to some major works in the comparative field and sub-fields. Comparative politics is a field that attempts to develop and test theories that can be used to explain political events and patterns across political systems, especially nation-states.

351. Western European Politics.
A graduate-level seminar on the domestic institutions and political processes defining Western Europe since 1945. Several countries, including Britain, France and Germany, are examined in the context of comparative themes.

247. Lincoln, Douglass, and Black Freedom.
In what was probably the world’s greatest century, marked by several national and international struggles for human freedom, two men stand head and shoulders above the many great men and women who participated in a civil war for American freedom: Abraham Lincoln and Frederick Douglass. At first glance, these two men had little in common; one born free on the American frontier, the other unfree in the heartland of slavery. Yet they had much in common; both largely self-educated, they both attained a mastery for words and the ability to communicate simply and directly with their fellow man. As if born to fight in one major battle for human freedom, these two men traveled diverse roads to meet on a momentous battlefield: black freedom and the future of America. Utilizing a wide range of sometimes opposing tactics, each in his own way shaped 19th century Americans understanding of what it meant to be free and a citizen.

A current list of courses (including courses offered by visiting faculty on a one-time basis) is available at the Skalny Center for Polish and Central European Studies.
Political Science

**Professor**

John Duggan, PhD (Caltech)
Professor of Political Science and of Economics

Thomas H. Jackson, PhD (Yale)
Distinguished University Professor of Political Science; Distinguished University Professor of Business Administration in the William E. Simon Graduate School of Business Administration; Professor in the W. Allen Wallis Institute of Political Economy

Bruce Jacobs, PhD (Harvard)
Professor of Political Science

Richard G. Niemi, PhD (Michigan)
Don Alonzo Watson Professor of Political Science

Charles E. Phelps, PhD (Chicago)
Professor of Political Science, of Economics, and of Community and Preventive Medicine

G. Bingham Powell, Jr., PhD (Stanford)
Marie Curran Wilson and Joseph Chamberlain Wilson Professor of Political Science

Lynda W. Powell, PhD (Rochester)
Professor of Political Science

Lawrence S. Rothenberg, PhD (Stanford)
Corrigan-Minehan Professor of Political Science

Joel Seligman, JD (Harvard University Law School)
Professor of Political Science and of Business Administration in the William E. Simon Graduate School of Business Administration; University President

**Associate Professor**

Kevin A. Clarke, PhD (Michigan)
Associate Professor of Political Science

Mark Fey, PhD (Caltech)
Associate Professor of Political Science

Gerald Gamm, PhD (Harvard)
Professor Emeritus of Political Science

Gretchen Helmke, PhD (Chicago)
Associate Professor of Political Science

James D. Johnson, PhD (Chicago)
Associate Professor of Political Science

Bonnie M. Meguid, PhD (Harvard)
Associate Professor of Political Science

David M. Primo, PhD (Stanford)
Associate Professor of Political Science

Curtis Signorino, PhD (Harvard)
Associate Professor of Political Science

Randall Stone, PhD (Harvard)
Associate Professor of Political Science

**Assistant Professor**

Hein Goemans, PhD (Chicago)
Assistant Professor of Political Science

Stuart Jordan, PhD (Princeton)
Assistant Professor of Political Science

Anastassios Kalandrakis, PhD (University of California, Los Angeles)
Assistant Professor of Political Science

**Professor Emeritus**

William T. Bluhm, PhD (Chicago)
Professor Emeritus of Political Science

Richard F. Fenno, Jr., PhD (Harvard)
William R. Kenan Emeritus of Political Science and Distinguished University Professor Emeritus

S. Peter Regenstreif, PhD (Cornell)
Professor Emeritus of Political Science and of Canadian Studies

Bethany Lacina, PhD (Stanford)
Assistant Professor

Michael Peress, PhD (Carnegie Mellon)
James P. Wilmot Distinguished Assistant Professor of Political Science

The Department of Political Science takes pride in its youth and its record of achievement. The PhD program is less than five decades old, and it is only since the 1970s that the department has supported one of the largest undergraduate concentrations in the College. Yet the department is now routinely ranked among the top handful of political science departments in the country. Senior scholars on the faculty include two fellows of the American Academy of Arts and Sciences, a former managing editor of the *American Political Science Review*, two Guggenheim fellows, and a Woodrow Wilson Center fellow. Additionally, faculty have been invited as visiting scholars to the Russell Sage Foundation, Harvard University’s Weatherhead Center for International Affairs, Nuffield College in Oxford, and the Center for Advanced Study in the Behavioral Sciences. The faculty also includes a large number of the discipline’s emerging young stars, scholars, and teachers engaged in innovative and award-winning work.

The department is constantly conscious of the relationship between teaching and scholarly research. William H. Riker, who established the graduate program at Rochester in the early 1960s, always held that scholarship consists in the production and dissemination of knowledge, and that publication and teaching ought to fit almost seamlessly together in that process. Thus, the faculty has been invited as visiting scholars to the Russell Sage Foundation, Harvard University’s Weatherhead Center for International Affairs, Nuffield College in Oxford, and the Center for Advanced Study in the Behavioral Sciences. The faculty also includes a large number of the discipline’s emerging young stars, scholars, and teachers engaged in innovative and award-winning work.

Today, as throughout the department’s history, the faculty remain committed to the principle that world-class teaching and research are complements. New research enriches and energizes the department’s teaching, and good teaching forces faculty constantly to re-evaluate research findings in light of new facts, questions, and events. Through coursework and internships—including programs in Brussels, London, Washington, and the local offices of the district attorney and public defender—the department presents students with multiple opportunities to study and immerse themselves in the hurly-burly of politics. Undergraduate students gain familiarity with American political behavior and institutions, political systems in other countries, the sources of international conflict and cooperation, political theory, and the systematic analysis of data and evidence. The department supports research and teaching centers in African-American politics and international politics, and it enjoys close working relationships with centers in political economy, Polish and Central European politics, and women’s studies.
The department’s distinctive strength is its emphasis on teaching students to look beyond unique events to general truths. The faculty is committed to providing students with the ability and tools to think for themselves about the world they inhabit—to question, to write clearly, to make and defend assertions, and to understand the relationship between theory and evidence. All political science majors take a course in basic political methodology, which provides them with the ability to read and interpret data. Additionally, they are required to take a course in argument, providing them with a framework to construct, defend, and criticize theories and evidence. Students who major in international relations are required to study diverse modeling approaches to international affairs and comparative politics. They must also take focused coursework in global security, political economy and development, or the governance of nations. Moreover, the department is distinctive in supporting a range of undergraduate courses in positive political theory. Students have a wide range of courses from which to choose, and they are encouraged to explore their interests with depth and passion. Every member of the faculty teaches undergraduates as well as graduate students, and all undergraduate concentrators are advised by full-time faculty members. Classes are generally small, and undergraduates have many opportunities to pursue scholarship at an advanced level.

The Department of Political Science offers programs in political science and international relations leading to the BA degree and the BA degree with honors. For undergraduates not majoring in political science or international relations, the department offers minors as well as 12 clusters.

BA in Political Science

For the full set of major requirements, visit the departmental website. The website is regularly updated with new courses, advising information, department events, office hours, and other information relevant to students.

Requirements

The major in political science requires that students successfully complete at least 12 courses, achieving a minimum overall grade point average of 2.0 in these courses. None of the 12 courses may be taken on a satisfactory/fail basis. As part of their major, students must fulfill the department’s upper-level writing requirement.

- The 12 courses are PSC 202, four political science field requirements, and seven other courses:
  - PSC 202, Argument in Political Science, is the only course specifically required for a major in political science.
  - Four field requirements:
    - Techniques of Analysis. PSC 200, 201, 203, or 204. (Students may also satisfy this requirement with ECO 230 or 231. However, ECO 230 or 231 counts as a course in an allied field rather than as a course in political science.)
  - American Politics. Choose at least one course from the list of approved courses.

Comparative Politics or International Relations. Choose at least one course in either field from the list of approved courses.

Positive Theory or Political Philosophy. Choose at least one course in either field from the list of approved courses.

- Seven additional courses:

  Students may choose any seven additional courses in political science. These may include any courses from the various fields, but may also include individualized research courses, internships, and associated courses. No more than three of these, however, may be chosen from the list of associated courses. As many as three of these seven courses may come from another department, provided they follow the guidelines in the next paragraph for courses in an allied field. Also, no more than four courses counted toward the major may be at the introductory level (generally, 100-level courses); of these four introductory courses, no more than one may come from another department.

Note on allied field: Courses in the allied field (up to three) may consist of any courses from either economics, history, or philosophy, provided that the courses come from the same department and that no more than one of these courses is at the introductory level. For courses from other departments or for interdepartmental allied fields, advisors expect students to provide a coherent justification for the courses chosen. A general guideline used to determine acceptability of a proposed allied field is that the courses enhance the students’ understanding of politics. Proposals that cut across departments or that include more than one introductory-level course require special justification. Changes to allied field courses other than those in the three listed departments must be approved in writing by an advisor.

BA in International Relations

For the full set of requirements for the major, visit the departmental website. The website is regularly updated with new courses, advising information, department events, office hours, and other information relevant to the major.

Requirements

The major in international relations requires that students successfully complete at least 12 courses, achieving a minimum overall grade point average of 2.0 in these courses. To fulfill the requirements of the major, students must also complete two college-level courses taught in a foreign language and participate in a program of Study Abroad. None of the 12 courses may be taken on a satisfactory/fail basis. At least 9 of these 12 courses must be in international relations or political science. No more than 4 introductory courses may be included in the 12 courses for the international relations major.

The 12 courses must include the 4 required core courses, 3 courses in the specialized tracks (at least 3 of which come from a single track), and 3 elective courses. The specialized tracks are global security, political economy and development, and governance of nations.
Core Requirements
All students must take four courses as specified below. Courses that appear in both categories can satisfy one or the other requirement, but not both.

Comparative Politics Core
- Students must take at least two courses from those listed below. IR/PSC 101 is strongly recommended as one of these two courses.
  - IR/PSC 101. Introduction to Comparative Politics
  - IR/PSC 250. Conflict in Democracies
  - IR/PSC 252. Ethnic Politics
  - IR/PSC 253. Comparative Political Parties
  - IR/PSC 256. Theories of Comparative Politics
  - IR/PSC 258. Democratic Regimes
  - IR/PSC 261. Latin American Politics
  - IR/PSC 263. Comparative Law and Courts
  - IR/PSC 264. Comparative Political Institutions
  - IR/PSC 265. Civil War and the International System
  - IR/PSC 271. Russia and Eastern Europe: Politics and International Relations
  - IR/PSC 276. The Politics of Insurgency and Terrorism

International Relations Core
- Students must take at least two courses from those listed below. IR/PSC 106 is strongly recommended as one of these two courses.
  - IR/PSC 106. Introduction to International Relations
  - IR/PSC 252. Ethnic Politics
  - IR/PSC 265. Civil War and the International System
  - IR/PSC 270. Mechanisms of International Relations
  - IR/PSC 272. Theories of International Relations
  - IR/PSC 274. Introduction to International Political Economy
  - IR/PSC 276. The Politics of Insurgency and Terrorism
  - IR/PSC 279. War and the Nation State

Specialized Tracks
Five courses, three of which must be from a single track.

Courses in international relations fall into specialized tracks. Students must choose five courses from these tracks, at least three of which must come from one selected track. At least two of the three courses in the selected track must be in international relations or political science. Courses applied to the comparative politics or international relations core requirements cannot count toward the track requirements.
- Track A: Global Security
- Track B: Political Economy and Development
- Track C: Governance of Nations

Electives
Students must select three other courses, which may be drawn from any of the courses in the three tracks, as well as from any other courses offered in international relations, political science, economics, or history. One elective course may be satisfied by earning a score of 4 or 5 on the Advanced Placement exam in American or Comparative Government.

Honors in Political Science and International Relations
The honors program offers high performing political science and international relations majors the opportunity to pursue an individualized research project during the senior year under the supervision of a faculty member. Students in the program enroll in IR/PSC 393W in both the fall and spring semesters of their senior year. The end result is a written thesis, which is graded by the advisor and a second member of the department faculty at the end of the senior year.

Successful pursuit of an honors project requires a student to start discussions with members of the department honors committee and prospective faculty advisors during the junior year or earlier. The department holds an information session about the program each fall and spring semester. Students interested in the program should attend one of these information sessions in the junior year or earlier. Dates, times, and locations of these information sessions are posted on the department calendar and are widely announced.

To be eligible for the program, students must be IR or PSC majors and must meet the following requirements as of the beginning of the fall semester of the senior year:
- Have a GPA of 3.5 or higher, calculated using all IR and PSC courses plus any other courses the students plan to count toward the IR or PSC major
- Have completed at least one course on techniques of analysis (PSC 200, 201, 203, 204, or 205, or ECO 230 or 231)
- Have completed a “W” course or another course that requires students to write a research paper
- If an IR major, have completed two of the four core courses for the IR major
- If a PSC major, have completed PSC 202

Students who meet these requirements must complete and submit the honors enrollment form to the honors coordinator by the seventh day after classes begin in the fall semester of the senior year. Note that completion of the form requires students to secure agreement from a faculty member to serve as their thesis advisor and approval of the political science department’s honors committee. Each member of the faculty needs considerable advanced notice to be able to serve as an advisor. Students should not expect to find a faculty advisor if they wait until the beginning of the fall semester of the senior year to look for one.

More detailed information about the program, including the standards the department applies in grading the senior thesis, can be found in “Expectations and Standards for Senior Thesis.”
Minor in Political Science

Requirements
Students must successfully complete five courses, of which no more than two may be from the list of introductory courses. None of the five courses may be taken on a satisfactory/fail basis. No course may be taken in the summer session or transferred from another school. Choice of courses must also satisfy the requirements specified below:

- Required course.: PSC 202 (Argument in Political Science) is the only course specifically required for a minor in political science.
- Techniques of Analysis: Choose PSC 200, 201, 203, 204, or 205. (Students may satisfy this requirement with ECO 230 or 231, but they must still take five courses in political science. The additional course may come from the fields of American Politics, Comparative Politics, International Relations, Positive Theory, or Political Philosophy.)
- American Politics: Choose one course.
- Comparative Politics or International Relations: Choose one course in either field, making certain that the course appears in the IR/PSC lists for the political science major. (Note that courses which carry an "IR" only designation do not satisfy this requirement.)
- Positive Theory or Political Philosophy: Choose one course in either field.

Minor in International Relations

Requirements
Students must successfully complete six courses, of which at least four must be taken in political science and/or international relations. No more than three courses (whether in political science, international relations, or another field) may be at the introductory level. None of the six courses may be taken on a satisfactory/fail basis. No course may be transferred from another school (except for approved courses taken abroad). Choice of courses must also satisfy the requirements specified below:

Comparative Politics Core
- Choose one course from the following list. IR/PSC 101 is strongly recommended, but not required. The course used to satisfy this requirement must be different from the course used to satisfy the requirement for the international relations core.
  - IR/PSC 101. Introduction to Comparative Politics
  - IR/PSC 106. Conflict in Democracies
  - IR/PSC 250. Comparative Political Parties
  - IR/PSC 253. Theories of Comparative Politics
  - IR/PSC 255. Democratic Regimes
  - IR/PSC 261. Latin American Politics

International Relations Core
- Choose one course from the following list. IR/PSC 106 is strongly recommended, but not required. The course used to satisfy this requirement must be different from the course used to satisfy the requirement for the comparative politics core.
  - IR/PSC 106. Introduction to International Relations
  - IR/PSC 270. Mechanisms of International Relations
  - IR/PSC 271. Theories of International Relations
  - IR/PSC 274. Introduction to International Political Economy
  - IR/PSC 276. The Politics of Insurgency and Terrorism
  - IR/PSC 279. War and the Nation State

Four Additional Courses
Choose any four courses (at least two in international relations or political science) from the list approved for the specialized tracks. Courses taken abroad may, upon approval, substitute for up to two of these courses.

Upper-Level Writing Requirement
Political science and international relation majors fulfill the department’s writing requirement by taking PSC 202 and one or more 200- or 300-level courses in political science that are designated as writing intensive. These courses carry a "W" designation. "W" courses require students to write a term paper of 10–15 pages (about 3,500 words), with the term paper involving research that goes beyond the regular class material. Faculty are encouraged to have students submit a draft of a portion of the term paper before they turn in the final product.

Clusters in Political Science and International Relations
The political science department offers a large and varied set of clusters. This is a full list of the clusters:
- America and the World
- American Political History
- American Politics and Policy
- Comparative Politics
- European Politics and Civilization
- International Relations
- Poland, Russia, and Central Europe
Political Economy
Political Methods and Theory
Political Philosophy
Politics and Mathematics
Politics and Religion
World Politics
Environmental Politics

Bear in mind that clusters sometimes are not updated quickly enough to include new courses. Please see an undergraduate advisor with any questions about clusters.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

REQUIRED COURSE

Through reading and several short papers, the course introduces students to the questions, concepts, and analytical approaches of political scientists.

TECHNIQUES OF ANALYSIS

Introduces the understanding of politics through data analysis. No prior computer or statistical expertise is expected.

201. Political Inquiry.
Introduces students to data analysis in political science. Begins by learning how to describe political data, and then to making inferences about political phenomena. No math beyond high school algebra is assumed.

203. Survey Research Methods.
Offers an introduction to the understanding of politics through data analysis, with particular emphasis on surveys of the mass public.

204. Research Design.
Learn the techniques behind designing research studies that allow political scientists and economists to answer questions in systematic fashion.

205. Introductory Statistical Methods.
Introduces data analysis, statistical inference, and research design, with a focus on techniques that are appropriate for political science data.

AMERICAN POLITICS

103. Great Debates in American Democracy.
Analyzes basic institutions and patterns of behavior in the American political system, drawing on historical as well as contemporary debates.

105. Introduction to American Politics.
Introduces students to the foundations of American government. Examines important political institutions and the linkage mechanisms that connect institutions, political actors, and ordinary American citizens.

121. Democracy in America.
Democracy literally means “rule by the people.” Explores various questions that this basic definition raises in the context of 21st-century American politics.

Seminar discovers rich history of Rochester as well as current debates over political organization, racial and economic segregation, suburbanization, and economic change.

209. Interest Groups in America.
Introduces the issues that concern political scientists (especially) and economists about interest groups in American politics.

The two-party system is America’s greatest contribution to free government. Examines the emergence of mass democracy in the United States and the origin and persistence of two-party politics.

212. Supreme Court in U.S. History.
Constitutional law cases decided by the U.S. Supreme Court and their impact on the evolution of the Court, the balance of powers among the three governmental branches, relations between the federal government and the states, and individual express and implied rights.

213W. The U.S. Congress.
Overview of the legislative branch of the U.S. government, including the electoral process, the nature of representation, legislative organization, the committee system, floor procedures, congressional parties, and inter-branch relations.

214. Political Violence in Comparative Perspective.
Examines the modes, scope, and theoretical perspectives of political participation in the United States and in other societies.

216. Legislative Politics.
Examines Congress in its dual roles as both a national lawmaking institution and as the nexus of public representation in the policymaking process.
Analyzes how public opinion is formed through the media. Examines the interaction of public opinion, mass media, and political leadership.

220. Social Movements in the U.S.
Explores the emergence of social movements in the U.S., with emphasis on the labor movement, the civil rights movement, the women’s movement, and other movements for social change.

222. The Presidency.
Introduces the major topics and theoretical perspectives in the study of the U.S. presidency.

Through the lens of the Constitution and Supreme Court cases, examines the structure of the American legal system (both separation of powers at the federal level and the authority of, and relationship among, states and the federal government), as well as the nature of civil rights of citizens.

225. Race and Political Representation.
Introduces students to the concepts, theories, and methodological approaches that political scientists use to examine the intersection of racial politics and political representation in the American political context.

237. Domestic Public Policy.
Examines major federal policy issues, especially those affecting the poor. Also discusses normative justifications for governmental actions, limitations imposed by bureaucracy, and the decision-making process.

238. Business and Politics.
Uses the tools of political science and economics to study how corporations affect and are affected by politics. Cases will be drawn from areas such as antitrust, transportation, health care, and the environment.

243. Environmental Politics.
Examines environmental issues from a social scientific perspective. Topics covered: the reasons for environmental regulation, the history of environmental policy, the state of contemporary environmental policy, the role of state and local governments, the impact of environmental activists, and a comparison of domestic and international regulation of environmental affairs.

244K. Politics and Markets.
Studies how entrepreneurship and innovation are affected by government institutions, then examines business strategy in the global business environment, focusing on the role of regulations imposed by foreign governments and international organizations.

245. Aging and Public Policy.
Covers policies in such areas as Social Security, public assistance, health care, and social services for the elderly.

Examines the potential for “green markets,” focusing on three drivers—social, political, and economic—that can both constrain firms and potentially condition whether issues of environment and sustainability can be exploited as a means for competitive advantage.

249. Sports and the American City.
Using the prism of sports, examines the growth of cities, industrialization, suburbanization, neighborhood change, political conflict, urban poverty, economic development. Pays special attention to issues of race, class, and gender.

280. Communism and Democracy in Eastern Europe.
Provides an introduction to the post-war political and social history of Eastern Europe from the establishment of the Communist regime until the present.

COMPARATIVE POLITICS

101. Introduction to Comparative Politics.
Introduces the study of political science and comparative politics. Focuses on how citizens may be able to control public policies in different modern democracies.

250. Conflict in Democracies.
Why are some democracies able to keep political conflict within constitutional boundaries while others are not? Theories are applied to the politics of several specific contemporary democracies, such as Germany, Italy, Russia, India, and Northern Ireland.

252. Ethnic Politics.
Explores the growing literature on ethnic politics in the comparative politics and international relations sub-fields.

253. Comparative Political Parties.
Examines the nature of political parties and political competition across democracies in the developed and developing worlds.

256. Theories of Comparative Politics.
Introduces theories in the field of comparative politics. Leads to understanding how the national and international environment, the political culture, the political institutions and the choices of citizens and leaders affect political performance. Explains democratization, stability, competition, citizen influence, and policy outcomes as consequences of the environment, culture and institutions—and human choices in these contexts.
258. Democratic Regimes.
Why have some countries made a successful transition to democracy, while others have not? Why are some democracies more stable than others? Course offers a survey of the leading literature in comparative politics centered on the topic of democratization.

262. Globalization Past and Present.
Examines the implications of economic globalization for domestic and international politics.

264. Comparative Political Institutions.
Examines political institutions and their implications for the behavior of political actors and their effects on social outcomes.

267. Identity, Ethnicity, and Nationalism.
Explores the concepts of identity, ethnicity and nationalism from a comparative perspective.

268W. Economics and Elections.
Examines the effect of elections and electoral systems on economic outcomes as well as the converse, how economic variation influences elections and the choice of electoral systems.

274. Introduction to International Political Economy.
Explores the interaction between politics and economics at the international level as well as between the international and domestic levels, involving various actors such as governments, interest groups, and multinational corporations.

276. The Politics of Insurgency and Terrorism.
Discusses the logic of asymmetric conflicts between states and non-state actors. We will examine the military, political, and social factors that determine when and where asymmetric warfare is likely to occur.

POSITIVE POLITICAL THEORY

108. Introduction to Political Economy.
Introduces the history of thought and current debates in political economy.

272. Theories of International Relations.
How do we explain patterns of war and peace? Why do states with common interests often fail to cooperate? This course surveys theories of international relations, focusing on explanations of conflict and cooperation.

280. Communism and Democracy in Eastern Europe.
Provides an introduction to the post-war political and social history of Eastern Europe from the establishment of the Communist regime until the present.
285. **Strategy in Politics.**

The fundamental assumption of this course is that in most important political and social settings the ability of any actor to achieve her objectives is dependent on what she expects other relevant actors to do. This sort of interdependency is the defining feature of strategic interaction.

288. **Game Theory.**

Provides a unified approach to understanding social phenomena such as arms races, provision of public goods, competition between firms, electoral campaigns, and bargaining. There are no formal prerequisites, but an aptitude for logical or mathematical reasoning is desirable.

**POLITICAL PHILOSOPHY**

104. **Introduction to Political Philosophy.**

Most aptly called Thinking about Politics, this course aims to examine a range of contemporary issues and to explore the political and philosophical conflicts and controversies that those issues raise.

121. **Democracy in America.**

Democracy literally means "rule by the people." Explores various questions that this basic definition raises in the context of 21st-century American politics.

221. **Philosophical Foundations of the American Revolution.**

Examines the philosophical foundations of the American Revolution by examining the political theory which lies behind the revolution itself and which underlies the foundations of the Constitution, while keeping an eye at the historical contexts that shaped the philosophy.

282. **Art and Politics.**

Drawing on art history, literature, and political theory, explores the ways that politics and the practices of artistic representation intersect. Much of the course will treat questions of race and identity, focusing on French and American examples.

283. **Contemporary Political Theory.**

Deals with the role of vision and representation in current political thought. Includes reading a variety of critics and theorists such as John Dewey, Michel Foucault, and Susan Sontag.

284. **Democratic Theory.**

Focuses on various topics in democratic theory such as the relation between democracy and other basic political principles (liberty, equality, justice), whether democratic institutions should best be aggregative or deliberative, and the role of referenda, lotteries and new telecommunications technology in democratic decision-making.

**ASSOCIATED COURSES AND ELECTIVES**

See department website for a full listing.

**INDIVIDUALIZED RESEARCH COURSES**

389W. **Junior Honors Seminar.**

Through reading and critiquing political science research in American politics, comparative politics, and international relations, students learn how to select a research question, formulate testable hypotheses, find and evaluate relevant literature, locate or collect data that addresses their research question, analyze the data, and write a research report.

390. **Supervised Teaching.**

391. **Independent Study.**

Work beyond the regular course offerings done by arrangement between students and full-time faculty.

392. **Practicum.**

393. **Senior Honors Project.**

A year-long research project supervised by a faculty member in the department and culminating in a written work.

**INTERNSHIPS**

394. **Local Law and Politics Internships.**

Most internship placements are in the District Attorney’s or Public Defender’s offices. Occasionally one or two other law placements are available. Students may also propose an alternative political or law placement.

397. **European Political Internship.**

Internships are available for students in Edinburgh, London, Brussels, Bonn, Berlin and Madrid. Internships are in English in Edinburgh, London, and Brussels; students need proficiency in the language for the latter three placements.
Psychology

Programs in psychology, including the major, the minors, and the CSSP clusters, are administered by the Department of Clinical and Social Sciences in Psychology (CSP). Courses in psychology—designated PSY courses—are offered by CSP and by BCS (the Department of Brain and Cognitive Sciences), and most PSY courses carry cross-listings as either CSP or BCS courses.

Instruction is offered throughout the broad spectrum of behavioral science. Its content covers theoretical, empirical, and technical presentations of psychology as both a social and natural science. Applications to health and helping professions and to business are common themes. Student experiences include large lecture classes with smaller discussion sections, and small lecture classes, seminars, and individualized research, laboratory, and internship courses. Undergraduates may register for graduate-level courses with permission of the instructor. Programs may be tailored to provide excellent background for graduate work in psychology, medicine, education, social work, law, business, and other related social and natural sciences as well as to occupations in business and human services.

Students planning to pursue graduate studies in psychology are advised to seek a broad foundation in psychology, an informed depth in their field of interest, and a working focus on the research literature and research methodologies. These students are also encouraged to take active roles in the ongoing research of faculty, the Undergraduate Psychology Council, and the local chapter of Psi Chi, the national honorary society in psychology.

BA in Psychology

This major partially fulfills requirements for the BA degree.

- PSY 101 or the equivalent must be completed before the student is accepted into the major.

- An acceptable statistics course, preferably by the end of the sophomore year. PSY 200, 211, STT 211, 212, or 213 is strongly recommended, although STT 203 may also be used to meet this requirement.

- In addition to the above, at least 10 courses comprising the following:

  - Two of the three core courses in natural science aspects of psychology: PSY 110, 112, and 113. BCS 111 may be substituted for BCS/PSY 112. Students who have taken NSC 201 (BCS 240), Basic Neuroscience, should not take PSY 110 or 113. Instead they should take one of the following advanced Brain/Behavior courses: PSY 172, Development of Mind and Brain; PSY 181, Animal Minds; PSY 220, The Intelligent Eye; PSY 221, Audition; PSY 242, Neuropsychology; PSY 246, Biology of Mental Disorders; or PSY 265, Language and the Brain.

  - Two of the three core courses offered in social science aspects of psychology: PSY 161, 171, and 181.

  - For students in the classes of 2014 and later: Five elective PSY courses, such that no more than two are independent study courses (numbered 39X).

For students in the classes of 2011–2013: Six elective PSY courses, such that no more than two are independent study courses (numbered 39X). One or two of the six elective courses may be courses in an allied field that inform the students’ pursuit of psychology. Allied field courses are frequently bridges to the students’ second major or a minor. At the time of declaring the major, the students should be prepared to argue for the appropriateness of the allied field choices.

- Two of the psychology courses must be designated upper-level writing courses and at least one of these must be at or beyond the 200 level.

- Pursuant to College rules, all courses in the major must be completed with a cumulative average of 2.0 (C) or better.

At most, two psychology courses in addition to the introduction and statistics courses may be transferred into the major from other institutions. Transferred courses into the major must be explicitly approved.

Honors in Psychology

Students should form the intention and plan to enter the honors program by the first semester of their junior year or before. Success in this program requires commitment to a working engagement with research in psychology. Students in the honors program should secure a faculty mentor early on in their pursuit of the degree. Most students in the honors program intend to pursue graduate study in psychology, and the program is tailored to their preparation for that goal. Students should apply to enter the honors program by no later than August 1 of their senior year. The application includes a research proposal approved by a faculty advisor in clinical and social sciences in psychology, brain and cognitive sciences, psychiatry, or other relevant departments. Applicants are selected based on the quality and feasibility of their research proposal, their research experience (at least one semester of independent research in psychology or one 300-level or higher course in psychology), completion of PSY 219W, Research Methods in Psychology, with a grade of B+ or better, GPA in psychology of 3.3 or better by the end of the junior year, and support of a faculty advisor.

Requirements for the honors degree in psychology:

- Admission into the honors program

- Completion of the requirements for the major in psychology and for the honors degree

- Completion of PSY 310, Honors Research I; PSY 311, Honors Research II; and an acceptable senior thesis

Minor in Psychology

PSY 101, Introduction to Psychology, or its equivalent is required for all minors. Declaration of a minor should be done with a CSP faculty advisor. Students may complete only one minor in psychology and may not do both the major and a minor in psychology.
Psychology

Five courses in addition to PSY 101:
- Three core courses in psychology of which at least one must be a natural science course (PSY 110, Neural Foundations of Behavior; PSY 112, Cognitive Psychology; or PSY 113, Biopsychology of Social and Clinical Behaviors), and one a social science course (PSY 161, Social Psychology and Individual Differences; PSY 171, Social and Emotional Development; PSY 181, Theories of Personality and Psychotherapy)
- Two further courses in psychology (PSY)

Psychology as a Natural Science

Four courses in addition to PSY 101:
- At least one natural science psychology core course (PSY 110, Neural Foundations of Behavior; PSY 112, Cognitive Psychology; or PSY 113, Biopsychology of Social and Clinical Behaviors)
- At least three further natural science psychology courses (PSY 113 and courses cross-listed as BCS courses), at least one of which is numbered 200 level or above. Independent study courses are acceptable

Psychology as a Social Science

Four courses in addition to PSY 101:
- Two of the three social science psychology core courses (PSY 161, Social Psychology and Individual Differences; PSY 171, Social and Emotional Development; or PSY 181, Theories of Personality and Psychotherapy)
- Two further social science psychology courses (CSP/PSY)

Organizational Psychology

Four courses in addition to PSY 101:
- PSY 161, Social Psychology and Individual Differences
- PSY 181, Theories of Personality and Psychotherapy
- PSY 264, Industrial and Organizational Psychology
- One course from the following: PSY 262, Human Motivation and Emotion; any 100-level social psychology (CSP/PSY) seminar; independent study; or practicum in organizational psychology

Health Psychology

Five courses in addition to PSY 101:
- PSY 110, Neural Foundations of Behavior, or PSY 113, Biopsychology of Social and Clinical Behaviors
- PSY 181, Theories of Personality and Psychotherapy
- PSY 282, Abnormal Psychology
- PSY 283, Behavioral Medicine
- One course from the following: PSY 289, Developmental Child Psychopathology; PSY 282, Seminar in Abnormal Psychology; or any advanced biopsychology course, independent study, or other approved course or practicum

Clinical Psychology

Four courses in addition to PSY 101:
- At least two of the following three: PSY 181, Theories of Personality and Psychotherapy; PSY 280, Clinical Psychology; or PSY 282, Abnormal Psychology.
- One or two courses from the following: PSY 283, Behavioral Medicine; PSY 289, Developmental Child Psychopathology; PSY 368, Seminar in Humanistic Psychology; PSY 381, Psychology of Developmental Disabilities; PSY 342, Neuropsychology, or PSY 346, Biology of Mental Disorders; PSY 281, Psychology and the Law

Social and Emotional Development

Four courses in addition to PSY 101:
- PSY 171, Social and Emotional Development
- Three electives from the following set: PSY 278, Adolescent Development; PSY 289, Developmental Child Psychopathology; PSY 383, Moral Development; PSY 377 (and/or PSY 378), Exploring Research in Family Psychology I (and/or II); PSY 381, Psychology of Developmental Disabilities; or PSY 386, Advanced Emotional Development

Upper-Level Writing Requirement

At the time the major is declared, students specify two courses in their program that meet or exceed criteria described below for including significant writing. At least one of these courses must be at the 200 level or higher.

Writing courses stress formal writing and may include literature review papers, research reports, and critical reviews of articles. The form of the document varies among courses, but all writing should conform generally to the appropriate guidelines in the American Psychological Association’s Publication Manual.

The criteria for significant writing are the following minimum set of assignments and activities:
- At least three formal writing assignments. (These could be linked by components of a larger document. If so, the separate parts must be clearly identified.)
- Each assignment is to be at least five (5) pages in length.
- Revision of at least one assignment with the benefit of instructor comments.
- Meet quality standards of clarity, conciseness, and completeness.

Independent study, laboratory courses, seminars, and small lecture courses in psychology may often be negotiated with the instructor to be “W” courses and carry writing credit although there will be exceptions. Many lecture courses that have small tagalong writing sections that carry 0.5 credits are designated as “W” sections.

Students who have declared their major in psychology may seek admission to tagalong writing sections in the first two weeks of the semester and enrollments will be allotted on need and first-come, first-served basis. Students are encouraged to consult with the individual faculty member regarding registration for writing courses.
Practical Experience in Psychology

The course PSY 394, Internship in Psychology, consists of a practical experience in an applied setting supervised on site. The internship is approved and overseen by a University instructor. A maximum of two internships can be counted toward the major. Internships are generally developed by student initiative and often grow out of volunteer experiences from which they are differentiated by a time requirement and academic content and credit. The general guidelines are 8–12 hours per week at the internship site; scheduled, periodic conversations with a faculty member about content and progress; and a final summary paper.

Undergraduate Organizations

The Psychology Undergraduate Council is open to all students interested in psychology. The council organizes or contributes to a number of events each year, such as faculty and outside speakers, independent study fairs, graduate study interest meetings, faculty/student social hours, and the Psychology Diploma Ceremony.

Psi Chi, the National Honor Society in Psychology, is open to majors or minors who meet Psi Chi’s academic requirements.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

GENERAL COURSE INFORMATION

An Introduction to Psychology course is a prerequisite for declaring the major and a requirement in the minors in psychology. It may be waived for students who receive a score of 3 or higher on the Advanced Placement psychology examination. A score of 4 or 5 on that examination will earn college credit for PSY 101. There is also a placement examination offered through the College Center for Academic Support. PSY 101 as a prerequisite or requirement is waived upon passing this exam.

Students taking psychology courses as part of a psychology degree should register for those courses under PSY.

THE INTRODUCTORY COURSE

PSY 101, Introduction to Psychology, is a balanced and integrated survey of psychology with coverage of both social and natural science domains. Sections of PSY 101 vary, but most consist of lectures, readings, discussions, and demonstrations. One fall section is limited to freshmen only. (Fall and Spring)

CORE COURSES IN PSYCHOLOGY

Core courses in psychology present surveys of their specific areas. They enter into the requirements for the major and the minors in psychology.

110. Neural Foundations of Behavior.

Introduces the structure and organization of the brain, and its role in perception, movement, thinking, and other behavior. Topics include the brain as a special kind of computer, localization of function, effects of brain damage and disorders, differences between human and animal brains, sex differences, perception and control of movement, sleep, regulation of body states and emotions, and development and aging.

112. Cognitive Psychology.

Provides an introduction to basic concepts in modern cognitive psychology. Topics covered include pattern recognition, attention and memory, concepts and categories, language comprehension and production, and higher-level thinking, such as reasoning and decision making.


An exploration of biological explanations of topics in social and clinical psychology, e.g., emotions, sexuality, psychopathology, and addictions.


An introduction to the field of social psychology and an overview of research on individual differences in personality. Topics include the self, attitudes, social cognition, emotion, interpersonal attraction, relationships, helping, social influence, group behavior, and dispositional differences among people. Students will complete several individual difference measures and receive individualized feedback at the end of the course. Format is lectures augmented with discussions and demonstrations.

171. Social and Emotional Development.

An examination of the interpersonal, emotional, cognitive, and environmental factors that influence children’s social and emotional development from early infancy through late adolescence.

181. Theories of Personality and Psychotherapy.

A survey of personality, emphasizing modern theoretical approaches, basic methods of investigation, and the relations of these theories to psychotherapy and behavioral change.

PSYCHOLOGY COURSES OFFERED BY CLINICAL AND SOCIAL SCIENCES IN PSYCHOLOGY

All courses beyond PSY 101 and PSY 113 offered by this department are cross-listed as CSP and PSY.

101. Introduction to Psychology.

Is a balanced and integrated survey of psychology with coverage of both social and natural science domains. Sections of PSY 101 vary, but most consist of lectures, readings, discussions, and demonstrations. One fall section is limited to freshmen only.
An exploration of biological explanations of topics in social and clinical psychology, e.g., emotions, sexuality, psychopathology, and addictions.

Introduction to field of social psychology and overview of research on individual differences in personality. Topics include: the self, attributions, social cognition, interpersonal attraction, relationships, helping, social influence, traits, and motive dispositions. Students complete and receive personal feedback on a number of personality measures.

171. Social and Emotional Development.
An examination of the interpersonal, emotional, cognitive, and environmental factors that influence children’s social and emotional development from early infancy through late adolescence.

181. Theories of Personality and Psychotherapy.
A survey of personality, emphasizing modern theoretical approaches, basic methods of investigation, and the relations of these theories to psychotherapy and behavioral change.

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 social and personal factors in psychosexual development.

211. Introduction to Statistical Methods in Psychology.
Introduction to the use of statistics in psychological research. Topics include descriptive statistics, correlation and regression, and inferential statistics. Examples are drawn from social and personality psychology. Logic of statistical inference and proper interpretation of research findings are emphasized. (Fall & Spring) Please note that, because of the significant overlap between them, students may earn degree credit for only one of these courses: BCS 200, CSP/PSY 211, STT 211 and STT 212.

219W. Research Methods in Psychology.
An introduction to the basic concepts, logic, and procedures needed to do psychological research. Hands-on experience with all major phases of the research process is provided, including: surveying the existing literature, developing research hypotheses, collecting and analyzing data, and reporting the results in manuscript form.

263. Relationship Process and Emotions.
Relationships are among the most important endeavors of human activity. In the past three decades, extensive theory and research has been devoted to understanding the processes that regulate thoughts, feelings, and behavior in meaningful relationships with friends, family, and romantic partners. We will review scientific research on important topics such as attraction, attachment, emotion, intimacy, conflict resolution, relationship development and deterioration, and the impact of relationships on physical health and emotional well-being.

264. Industrial and Organizational Psychology.
Applications of psychological theory and research to work settings. Topics include personnel selection, training and appraisal; organizational structure and transformation; performance in work groups; motivation and satisfaction; leadership; work conditions; and cross-cultural issues.

266. Research Laboratory in Social Psychology.

267. Psychology of Gender.
Exploration of the ways males and females differ in interaction, theories of development of sex differences, consequences for social change.

278. Adolescent Development.
This course surveys theory and research relating to normal development during adolescence. Adolescent development is examined in a variety of contexts, including families, peer groups, and schools, and issues pertaining to biological, social, and cognitive development are discussed.

280. Clinical Psychology.
An introduction to the field of clinical psychology. Students are exposed to prevalent theoretical and research models, as well as approaches and research findings to assessment and diagnosis, and treatment modalities.

281. Psychology and the Law.
This course provides an introduction and overview to the intersection between psychology and the legal system. Topics will include: forensic assessment, expert testimony, children and adolescents and the legal system, and the application of psychological science to legal issues.

282. Abnormal Psychology.
This course provides a conceptual overview to the field of psychopathology. We will discuss assessment and diagnosis, etiology, developmental course, treatment, and prognosis of the major psychological disorders. Current theory and research will be emphasized.
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.

Presents theory, research, assessment, and intervention in child and adolescent psychological disorder. Contributions of the normal developmental perspective to understanding psychopathology and risk, and vice versa, are emphasized.

301W. Teaching Psychology.
In-depth consideration of topics in psychology and their communication. PSY 101 is a lab for this course.

310W. Honors Research.
Development and conduct of research leading to the Honors Thesis.

311. Honors Research.
Development and conduct of research leading to the Honors Thesis.

364. Achievement and Motivation.
Seminar on achievement motivation, including achievement motives, achievement goals, and the strategies individuals use in achievement settings.

Determinants and consequences of the need for control and perceived control, and their relation to individual and social behavior.

368W. Seminar in Humanistic Psychology.
An introduction to the theory and methods of humanistic psychology with particular emphasis on humanistic approaches to psychotherapy and growth. The approach is learning through experience. The class employs the methods of humanistic psychology, including demonstrations and experimentation. Assignments include regular reading and writing. Writings require the applications of theory to one's own life experiences. This is an upper-level writing course for all participants.

Guided by a family systems perspective, this seminar explores children's social and emotional development within contexts of parent-child, interparental, and sibling relationships. Designed for advanced undergraduate students, the course primarily covers research findings and theories and requires research proposal writing and class presentations.

373. Exploring Research in Social Psychology I.
First-hand team experience with ongoing research in social psychology areas.

374. Exploring Research in Social Psychology II.
First-hand team experience with ongoing research in social psychology areas.

375. Advanced Topics: Relationships and Emotions.
This seminar reviews theory and research in the social psychology of relationships and emotions. Topics include attraction, theories of social interaction, relationship maintenance processes, emotional expression in relationships, and emotion regulation. Class format will be discussion of published empirical studies and theories. Evaluation will be based on written assignments, class participation, and an oral presentation. Students who enroll for the course should be comfortable reading empirical articles from the psychological literature. Content of this course is intended to build on CSP/PSY 263.

376. Seminar in Self-Determination.
Deals with the field of human motivation with particular emphasis on intrinsic motivation and the meaning of self-determination in human functioning. A theoretically oriented course that reviews a range of research projects.

377. Exploring Research in Family Psychology I.
Provides guided, direct, research experiences in investigating the interplay between family relationships and children's social and emotional development. Emphasis is placed on gaining knowledge in translating theories (e.g., family systems theory) into empirically testable hypotheses and designing research methods and techniques to test predictions.

378. Exploring Research in Family Psychology II.
Provides guided, direct, research experiences in investigating the interplay between family relationships and children's social and emotional development. Emphasis is placed on gaining knowledge in translating theories (e.g., family systems theory) into empirically testable hypotheses and designing research methods and techniques to test predictions.

381. Psychology of Developmental Disabilities.
This course provides an introduction to the unique characteristics and challenges of individuals with developmental disabilities across the lifespan. We address the main concepts and issues involved in the identification, treatment, education, and support of children and adults with mental retardation and other developmental disabilities. We also explore current beliefs about intelligence, historical trends in society's perspectives on disabilities, and legal and ethical considerations. The class format includes both lecture and discussion.
383. Moral Development.
This seminar focuses on the psychological study of moral development. Different theoretical approaches to morality and related empirical research are discussed. The primary focus is from a developmental psychology perspective, but philosophical and educational issues also are considered.

384. Practicum in Developmental Disabilities.
Explores educational, therapeutic, and social challenges in developmental disabilities. Students spend approximately eight hours per week in a supervised educational or treatment setting as well as participate in weekly meetings to review and discuss general issues in the field.

385. Practicum in Developmental Disabilities.
Explores educational, therapeutic, and social challenges in developmental disabilities. Students will spend approximately 8 hours per week in a supervised educational or treatment setting as well as participate in weekly meetings to review and discuss general issues in the field.

388. Research Practices in Developmental Psychopathology I.
Experience in conducting research in the area of developmental psychopathology involving patterns of development in high-risk children.

389. Research Practices in Developmental Psychopathology II.
A continuation of CSP 388.

390. Supervised Teaching.

391. Independent Study.

392. Practicum.

394. Internship.

Consideration of recent experimental and theoretical contributions in several selected areas of psychology.

PSYCHOLOGY COURSES OFFERED BY BRAIN AND COGNITIVE SCIENCES

All courses below are cross-listed as BCS and PSY.

110. Neural Foundations of Behavior.
Introduces the structure and organization of the brain, and its role in perception, movement, thinking, and other behavior. Topics include the brain as a special kind of computer, localization of function, effects of brain damage and disorders, differences between human and animal brains, sex differences, perception and control of movement, sleep, regulation of body states and emotions, and development and aging.

112. Cognitive Psychology.
Provides an introduction to basic concepts in modern cognitive psychology. Topics covered include pattern recognition, attention and memory, concepts and categories, language comprehension and production, and higher-level thinking, such as reasoning and decision making. Students cannot receive credit for both BCS 111 and BCS/PSY 112.

151. Perception and Action.
Explores how the biology of our senses shapes perceptual experiences of reality. Emphasizes sense of sight primarily and hearing secondarily. An important theme is that our sensory systems play a crucial role in the execution of coordinated movements of our bodies, as we navigate in, and interact with, the environment.

152. Language and Psycholinguistics.
Overviews the nature and processing of human languages, including comparisons between language and animal communication systems, the biological bases of human language, and the cognitive mechanisms used in producing, understanding, and learning language.

Considers human cognitive processes, including behavioral and computational methods used to understand the nature of cognition. Explores how we perceive and integrate sensory information to build a coherent perception of the world; how we memorize and retrieve information; how we reason and solve problems.

172. Development of Mind and Brain.
Introduces human development, focusing on the ability to perceive objects and sounds, to think and reason, and to learn and remember language and other significant patterned stimulation. Includes the nature and mechanisms of development in humans and an overview of what is known about brain and behavioral development in other species.

183. Animal Minds.
Considers the cognitive and communicative abilities of animals, especially primates, as compared with humans. Topics include thinking, reasoning, remembering, communicating, and understanding number, time, and causality, in animals ranging from ants to apes.

Introduces statistical methods including descriptive statistics (count, central tendency, dispersion), hypothesis testing (significance, t-test, chi-square, etc.) and elements of correlation, regression, and interaction. Emphasis is on what a technique does at a conceptual level, how a technique is reported in the literature, and how to execute a technique. Because of the significant overlap between BCS 200, CSP/PSY 211, STT 211 and STT 212, students may earn degree credit for only one of these courses.
205. Lab in Development and Learning.
Introduces behavioral methods used to study the development of perception, cognition, and language, and provides hands-on experience in the testing of human infants and children. Includes two research projects and a final powerpoint presentation.

208. Lab in Perception and Cognition.
Introduces behavioral and psychophysical studies of perceptual and cognitive phenomena. Students perform, analyze, interpret, and report results from experiments that move from reproducing classic phenomena to conducting new studies independently.

220. The Intelligent Eye.
Provides an interdisciplinary view of modern research into how the human brain solves the problems involved in perception, including how we perceive the three-dimensional structure of the world, how we recognize objects and how visual information is used to control action in the world. Students read contemporary research and, through classroom discussion and critical essays, explore and analyze the questions and debates that define contemporary perceptual science.

221. Audition.
Examines the physiological substrate responsible for hearing. Topics include the physical stimulus for hearing, receptive aspects of speech and language, peripheral physiology (the outer and middle ears, cochlea, and auditory nerve), and central physiology (brainstem nuclei, auditory cortex, descending systems). Introduces electrophysiological techniques used to study auditory function, and explores sensory and perceptual correlates of physiology and sensorineural hearing loss.

228. The Human-Machine Interface.
Surveys the factors that influence human performance with machines and other artificial systems, including: sensory and motor function, information processing, memory, motivation, decision making, problem solving, the influence of the environment, and facilitators such as instructions, performance aids, selection, and training. Includes in-depth consideration of visual displays and motor input.

Examines clinical neuropsychology, which bridges psychology, neuroscience, and clinical psychology. Covers history of clinical neuropsychology, principles of neuropsychological assessment, and the interpretation of cognition and behavior as they relate to brain dysfunction. Considers specific neurological syndromes including neurodegenerative, cerebrovascular, toxic, and memory disorders; epilepsy; head trauma; infectious processes; pediatric neuropsychology; psychiatric syndromes; and forensic neuropsychology. Patient presentations (videotape and in-person interviews) supplement lectures.

246. Biology of Mental Disorders.
Examines the neurobiology of anxiety/phobic conditions, mood disorders, and chronic psychotic states, particularly schizophrenia. Considers definitions of psychiatric syndromes, the problems of diagnosis, brain organization, and neurotransmitter systems involved in state functions. Introduces research approaches including epidemiologic, phenomenologic, family/adoption, longitudinal descriptive, psychophysiologic, neuropharmacologic, genetic linkage, and postmortem studies; emphasizes recent in vivo brain imaging and neuroreceptor studies.

259. Language Development.
Introduces children’s language development, including the acquisition of phonology, syntax, and semantics. 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.

261. Language Use and Understanding.
Explores the cognitive mechanisms used to speak and understand language, with a special focus on contextually situated language use. Studies the moment-by-moment processes underlying language production and comprehension, including how speakers choose words and phrases and how listeners understand them.
Public Health–Related Programs

Theodore M. Brown, PhD (Princeton)
Professor of History, of Community and Preventive Medicine, and of Medical Humanities

Richard Dees, PhD (Michigan)
Professor of Philosophy, of Neurobiology, of Pediatrics, and of Medical Humanities

Nancy Chin, PhD (Rochester)
Associate Professor of Community and Preventive Medicine, and of Medical Humanities

Edwin van Wijngaarden, PhD (North Carolina, Chapel Hill)
Assistant Professor of Community and Preventive Medicine, and of Environmental Medicine

With educational programs in the Department of Community and Preventive Medicine that are accredited by the Council on Education for Public Health, a comprehensive set of course offerings on the River Campus, and administrative and faculty support from both the College and the Medical Center, the University of Rochester is well-positioned to provide a successful, interdisciplinary undergraduate program in public health. The overarching goal of the program is to educate students in an interdisciplinary framework of understanding and responding to global, regional, and local public health challenges. The program offers four majors leading to the BA degree: bioethics; epidemiology; health, behavior, and society; and health policy. A fifth major is expected to be proposed shortly. The program also offers a number of minors and clusters (students may choose to major, or minor, or complete a cluster within the program, but may not do more than one).

The curriculum integrates a wide array of disciplines that support the field of public health. This integration is apparent across majors by requiring a set of core competencies regardless of the public health major, and within each major by incorporating a variety of disciplines that support the research needs of the major.

BA in Bioethics

Bioethics examines the major ethical and related legal questions that arise in medicine and public health, and the frameworks in which individual, social, and political moral decisions should be made. The major also involves understanding the most important controversies in bioethics, and developing tools to analyze moral arguments in bioethics and construct arguments that contribute to these debates. There are 12 required courses.

Public Health Common Core Courses
PH 101. Introduction to Public Health I
PH 102. Introduction to Public Health II
PH 103. Concepts of Epidemiology
STT 212. Applied Statistics for Biological and Physical Sciences I
STT 211. Applied Statistics for Social Sciences I
PHL 228. Public Health Ethics

or

PHL 225. Ethical Decisions in Medicine

Bioethics Core Courses
PHL 102. General Ethics
PHL 225W. Social and Political Philosophy
PSC/PH 236. Healthcare and Law

One additional bioethics course (must be PHL 228 if not taken as part of Public Health Common Core courses)

PHL 225W. Ethical Decisions in Medicine
PHL 228W. Public Health Ethics

Electives

Three are required, two of which must come from the “philosophy and ethics” group.

Philosophy and Ethics
PHL 103. Contemporary Moral Problems
PHL 220/220W. Recent Ethical Theory
PHL 226. Philosophy of Law
PHL 230W. Environmental Justice

History, Sociology, and Anthropology
ANT 216. Medical Anthropology
HLS 116. Introduction to the U.S. Health System
HIS 208W. Medicine, History, and Social Reform
HIS 209W. Changing Concepts of Health and Illness
HIS 287. History of International and Global Health
SOC 262. Medical Sociology

Upper-Level Writing Requirement

Students are required to complete two upper-level writing courses. The courses designated with “W” satisfy the requirement. For existing College courses that meet the upper-level writing requirement, registration rules will follow those determined by their respective home departments.

Minor in Bioethics

The bioethics minor consists of a minimum of six courses (three required and three electives).

Required Courses
PH 101. Introduction to Public Health I
PH/PSC 236. Healthcare and Law
Choose one of the following:
PHL 225. Ethical Decisions in Medicine
or
PHL 228. Public Health Ethics

Choose three of the following:
PHL 102. Ethics
PHL 103. Contemporary Moral Problems
PHL 220W. Recent Ethical Theory
PHL 223W. Social and Political Philosophy
PHL 225. Ethical Decisions in Medicine (if not taken from group above)
PHL 226. Philosophy of Law
PHL 228. Public Health Ethics (if not taken from group above)
PHL 230. Environmental Justice

**BA in Epidemiology**

Epidemiology examines the principles and skills required to examine factors associated with the development and prevention of disease. The major involves understanding theories, concepts, and skills required to assess population health and develops basic tools to analyze data applicable to public health outcomes. The major also examines factors associated with the development and prevention of disease using different methodologies. There are 15 required courses and 2 foundational courses.

**Foundational Courses**
MTH 161-162
Calculus I-II (or MTH 141-143)

**Public Health Common Core Courses**
PH 101. Introduction to Public Health I
PH 102. Introduction to Public Health II
PH 103. Concepts of Epidemiology
STT 212. Applied Statistics for Biological and Physical Sciences I
or
STT 211. Applied Statistics for Social Sciences I
PHL 228. Public Health Ethics
or
PHL 225. Ethical Decisions in Medicine

**Epidemiology Core Courses**
PM 414W. History of Epidemiology
PM 415. Introduction to Epidemiology
PM 494. Epidemiology of Chronic Diseases
PM 451W. Epidemiology of Infectious Diseases
STT 216. Applied Statistics for the Biological and Physical Sciences II
MTH 218. Introduction to Mathematical Models in the Life Sciences
PM 412. Survey Research

**Electives**
Three are required, two of which must come from the "epidemiology" group.

**Epidemiology**
PM 413H. Field Epidemiology
PM 418W. Cardiovascular Epidemiology
PM 442W.H. Nutritional Epidemiology
PM 470W. Environmental and Occupational Epidemiology
BST 465. Design of Clinical Trials

**Statistics**
MTH 201. Introduction to Probability
MTH/STT 203. Introduction to Mathematical Statistics
STT 221W. Sampling Techniques
STT 226W. Introduction to Linear Models
STT 227. Introduction to Statistical Software I
STT 278. Methods of Data Analysis

**Upper-Level Writing Requirement**
Students will be required to complete two upper-level writing courses. The courses designated with “W” will satisfy the requirement. Each “W” section offered by Community and Preventive Medicine (PM) has a cap of five students per semester. For existing College courses that meet the upper-level writing requirement, registration rules will follow those determined by their respective home departments.

**Minor in Epidemiology**
The epidemiology minor consists of a minimum of six courses (three required and three electives).

**Required Courses**
PH 101. Introduction to Public Health I
PH 103. Concepts of Epidemiology

**Choose one of the following:**
STT 211. Applied Statistics for Social Sciences I
STT 212. Applied Statistics for Biological and Physical Sciences I

**Choose three of the following:**
PM 413. Field Epidemiology
PM 414. History of Epidemiology
PM 415. Introduction to Epidemiology
PM 451. Infectious Disease of Epidemiology
PM 494. Epidemiology of Chronic Diseases

**BA in Health, Behavior, and Society**

Health, behavior, and society examines the psychological and societal structures and mechanisms that affect human health and health behavior. Health and disease do not depend uniquely on biological mechanisms but also include societal and cultural influences. The major also examines the role of behavioral theory, research, and clinical practice in the promotion and maintenance of physical health and well-being. There are 12 required courses and 2 foundational courses.

**Foundational Courses**
- ANT 102. Introduction to Medical Anthropology (or other anthropology course)
- PSY 101. Introduction to Psychology

**Public Health Common Core Courses**
- STT 212. Applied Statistics for Biological and Physical Sciences I
  or
- PH 101. Introduction to Public Health I
- PH 102. Introduction to Public Health II
- PH 103. Concepts of Epidemiology
- STT 212. Applied Statistics for Biological and Physical Sciences I
  or
- STT 211. Applied Statistics for Social Sciences I
- PHL 228. Public Health Ethics
  or
- PHL 225. Ethical Decisions in Medicine

**Health, Behavior, and Society Core Courses**
- ANT 216. Medical Anthropology
- HLS 116. Introduction to the U.S. Health System
- CSP/PSY 161. Social Psychology and Individual Differences
- CSP/PSY 283. Behavioral Medicine

**Electives**
Three are required, two of which must come from the “history, social, and behavioral medicine” group.

**History, Social, and Behavioral Medicine**
- CAS 397. European Health Sciences Internship
- HIS 208. Health, Medicine, and Social Reform
- HIS 209. Changing Concepts of Disease
- HIS 287. History of International and Global Health
- HLS 216. Peer Health Advocacy I
- PM 426. Social and Behavioral Medicine
- SOC 262. Medical Sociology

**Anthropology, Psychology, and Sociology**
- ANT 218. Birth and Death I: Vital Events in Our Personal Lives
- ANT 278. Birth and Death II: Making Populations Healthy
- BCS/PSY 246. Biology of Mental Disorders
- CSP/PSY 267. Psychology of Gender
- WST 206. Feminism, Gender, and Health

**Upper-Level Writing Requirement**
Students are required to complete two upper-level writing courses. The courses designated with “W” will satisfy the requirement. Each “W” section offered by the Department of Community and Preventive Medicine (PM) has a cap of five students per semester. For existing College courses that meet the upper-level writing requirement, registration rules will follow those determined by their respective home departments.

**Minor in Health, Behavior, and Society**
The health, behavior, and society minor consists of a minimum of six courses (two required and four electives).

**Required Courses**
- PH 101. Introduction to Public Health I
- HLS 116. Introduction to the U.S. Health System

**Electives**
- ANT 216. Medical Anthropology
- ANT 218. Birth and Death I: Vital Events in Our Personal Lives
- CAS 397. European Health Sciences Internship
- CSP/PSY 161. Social Psychology and Individual Differences
- CSP/PSY 283. Behavioral Medicine
- HIS 208. Health, Medicine, and Social Reform
- HIS 209. Changing Concepts of Disease
- HIS 287. History of International and Global Health
- HLS 216. Peer Health Advocacy I
- PM 426. Social and Behavioral Medicine
- SOC 262. Medical Sociology

**BA in Health Policy**

Health policy examines the role of health policy analysis in assessing population health and studies health policy in relation to the organization, financing, and provision of health care in the United States. The major examines how the principles of statistics, economics, and political science apply to health policy and how current policies relating to population health at the federal, state, and local levels are understood. The major also applies the principles of health policy analysis to population health. There are 13 required courses and 4 foundational courses.
**Foundational Courses**
- MTH 141-143. Calculus I-III (or MTH 161-162)
- ECO 108. Principles of Economics

**Public Health Common Core Courses**
- PH 101. Introduction to Public Health I
- PH 102. Introduction to Public Health II
- PH 103. Concepts of Epidemiology
- STT 212. Applied Statistics for Biological and Physical Sciences I
- or
- STT 211. Applied Statistics for Social Sciences I
- PHL 228. Public Health Ethics
- or
- PHL 225. Ethical Decisions in Medicine

**Health Policy Core Courses**
- ECO 207. Intermediate Microeconomics
- ECO 230. Economic Statistics
- or
- PSC 200. Applied Data Analysis
- ECO 236. Economics of Health
- HIS 305W.H. Health Policy and Politics
- HLS 116. Introduction to the U.S. Health System
- PSC 243. Environmental Politics

**Electives**
Two are required, one of which must come from the “health services research and policy” group.

**Health Services Research and Policy**
- PSC 237. Domestic Social Policy
- PSC/PH 236. Health Care and the Law
- PM 221. U.S. Health Care System
- PM 443W. Introduction to Health Services Research
- PM 448W.H. Health Policy Analysis
- CAS 397. European Health Sciences Internship
- HIS 287. History of International and Global Health

**U.S. Politics**
- PSC 105. Introduction to American Politics
- PSC 209. Interest Groups in America
- PSC 211. Public Opinion and Voting
- PSC 231. Money and Politics

**Upper-Level Writing Requirement**
Students are required to complete two upper-level writing courses. The courses designated with “W” satisfy the requirement. Each “W” section offered by the Department of Community and Preventive Medicine (PM) has a cap of five students per semester. For existing College courses that meet the upper-level writing requirement, registration rules will follow those determined by their respective home departments.

**Minor in Health Policy**
The health policy minor consists of a minimum of six courses (two required and four electives).

**Required Course**
- PH 101. Introduction to Public Health I

**Choose one of the following:**
- HLS 116. Introduction to the U.S. Health System
- or
- PM 221. U.S. Health Care System

**Choose four of the following:**
- CAS 397. European Health Sciences Internship
- ECO 207. Intermediate Microeconomics
- ECO 230. Economic Statistics
- ECO 236. Economics of Health
- HIS 305. Health Policy and Politics
- PSC 200. Applied Data Analysis
- PSC 237. Domestic Social Policy
- PSC 243. Environmental Politics
- PSC 245. Aging and Public Policy

**Honors and Distinction in Public Health**
All public health majors offer an honors program. Eligible students are invited to apply. Invitations are based on a 3.7 or higher grade point average in the five common core courses (all five need to have been completed by the end of the junior year) and on progress toward finishing requirements for the major. Interested students who receive an invitation will need to apply formally to enroll in the honors program.

Accepted students must complete at least one advanced course designated with an “H” and 8 credit hours of independent study over and above the credits required for the major. This independent study (PH 391 for the fall semester and PH 393 or PH 398 for the spring semester of the senior year) includes a distinguished research paper under the direction of a faculty advisor. To receive honors, the thesis must be of at least A– quality. Each major has a distinction program, and the requirements for qualifying for different levels of distinction are the same across all majors. A grade point average of at least 3.4
in courses submitted for the major qualifies for “distinction,” a
grade point average of at least 3.6 in courses submitted for the
major qualifies for “high distinction,” and a grade point average
of at least 3.8 in courses submitted for the major qualifies for
“highest distinction.”

Double Majors
Since all majors within the public health program share five com-
mon core courses, the College’s overlap policy precludes students
from obtaining a double major within the group of public health
majors. Students are permitted to combine a major from the
public health program with a major in another discipline. Due to
the interdisciplinary nature of the public health-related majors,
no more than two courses may be shared between a public health
major and a major in another discipline.

Public Health and a Health Professions
Interest
A public health-related major can easily integrate with an inter-
est in the health professions, such as medical or dental school.
Pre-health students may approach completing the necessary pre-
health admission requirements in several different ways. It is to
the applicants’ advantage to tailor their schedules to reflect their
specific needs and strengths. Students are strongly encouraged to
consult with a Health Professions advisor in the College Center
for Academic Support (CCAS) for further program planning
assistance.

The 3-2 Option
The Department of Community and Preventive Medicine in the
School of Medicine and Dentistry offers a 3-2 program in public
health.

The Master of Public Health (MPH) 3-2 Program is open
to University of Rochester undergraduates who meet MPH
program criteria and are accepted by the MPH Admissions
Committee. This highly selective program allows talented
undergraduates to get their bachelor’s degree and the MPH
degree from the School of Medicine and Dentistry in five years,
a savings of one year over the typical “4 plus 2” years if the two
degrees were pursued sequentially.

Applicants apply in the spring of their junior year of college,
with applications reviewed by the MPH Admissions Committee
after the applicants’ second semester junior year grades are avail-
able. Successful applicants spend their senior year of college taking
first-year MPH courses, and the following year—year five—they
complete the MPH requirements and receive the MPH degree.

In addition to strong Graduate Record Examination scores,
the Admissions Committee looks for an accomplished aca-
demic record and demonstrated commitment to pursue graduate
study. Community service, work experience, and participation
in research relevant to public health are all considered favorably
by the Admissions Committee. Strong endorsements by referees
who know the applicants in both academic and noncurricular
settings are also most helpful to the committee.

Becoming an MPH student in the 3-2 program is ap-
propriate for mature college students with excellent academic
credentials and significant “real world” experience who make a
strong case that the MPH degree is consistent with their career
goals. Potential 3-2 applicants are strongly advised to discuss the
3-2 program with their undergraduate advisor as well as with
the director of the MPH program. Early planning for the 3-2
program is essential.

For further information contact: Public Health–Related
Programs at www.rochester.edu/College/msc/publichealth.
Religion and Classics

Professor

Douglas R. Brooks, PhD (Harvard)
Professor of Religion
Th. Emil Homerin, PhD (Chicago)
Professor of Religion
Edward Wierenga, PhD (Massachusetts)
Professor of Religion and of Philosophy; Chair of the Department

Associate Professor

Daniel Beaumont, PhD (Princeton)
Associate Professor of Arabic Language and Literature
Curt Cadorette, PhD (University of St. Michael's College)
John Henry Newman Associate Professor of Roman Catholic Studies and Associate Professor of Religion
Alfred Geier, PhD (Johns Hopkins)
Associate Professor of Classics

Assistant Professor

Elizabeth Colantoni, PhD (Michigan)
Assistant Professor of Classics
Margarita Simon Guillory, PhD (Rice University)
Assistant Professor of Religion
Nora Rubel, PhD (North Carolina, Chapel Hill)
Assistant Professor of Religion

Senior Lecturer

Anne Merideth, PhD (Princeton)
Senior Lecturer in Religion, Director of Undergraduate Studies

Lecturer

Michela Andreatta, PhD (University of Turin, Italy)
Lecturer in Hebrew
Nicholas Gresens, PhD (Indiana)
Lecturer in Classics
*Catherine Schulenberg, BA (University of Washington)
Lecturer in Arabic Language

Professor Emeritus

William Scott Green, PhD (Brown)
Philip S. Bernstein Professor Emeritus of Judaic Studies and Professor Emeritus of Religion; Dean Emeritus of the College
Grace G. Harris, PhD (Cambridge)
Professor Emeritus of Anthropology and of Religion

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 Asian 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 Asian cultures and study the ways these have persisted and changed from ancient to contemporary times.

BA in Religion

The goal of a major in religion is to achieve an understanding of the nature of diverse religions, the methods employed in their study, and to achieve a measure of competence within a specific tradition or area. In addition to lecture courses, seminars, reading courses, and the senior seminar allow for intensive study of particular topics.

A minimum of 10 courses is required:

- Either REL 101 or 102.
- One course in the history of a tradition, either REL 103, 104, 105, 106, 107, or 108.
- REL 293 W, normally taken in the junior year.
- Six other courses, no more than three of which may focus on the same religious tradition.
- Senior Thesis (REL 393 W) or Senior Seminar (REL 389 W).

A major in religion may include no more than three courses below 110.

Since knowledge of a foreign language is fundamental to the study of religion and a requirement for many graduate programs in the study in religion, majors in religion are strongly encouraged to study a language relevant to their area of interest.

Honors in Religion

Students may earn their degree in religion with honors. This program is open only to students who have compiled a superior academic record, who by virtue of their previous coursework are prepared to pursue an advanced research project, and who are capable of independent work of high quality. Typically, students write a senior honors thesis (REL 393 W) after completing a semester of honors research (REL 392) in a previous semester.

- Eight credits of honors coursework with a grade of at least B+ selected from the following honors courses:
  - REL 293 W. Theories of Religion
  - REL 389 W. Senior Seminar
  - REL 392. Honors Research. Independent study taken as preparation for writing the senior thesis.
  - REL 393 W. Senior Thesis
- A successful oral defense and public presentation of the thesis.

Please see the department web page for further information about honors in religion.

Minor in Religion

- Either REL 101 or 102.
- One course in the history of a religious tradition, either REL 103, 104, 105, 106, 107, or 108.
- REL 293 W.
- Three other courses in religion, selected in consultation with the students’ advisor in the department.

* Part-time
BA in Classics

The major in classics is language-centered. Coursework in Greek and Latin is supplemented by studies in ancient literature, religion, philosophy, history, art, and archaeology. The goal of the major is to be able to analyze and interpret significant texts in the ancient languages and to understand their cultural context. Students may choose a major 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.

A minimum of 11 courses is required, including:

- At least six language courses numbered 103 or above.
- A course focusing on the history of the ancient world, e.g., CLA 102, 115.
- A course focusing on the philosophical writings of the ancient world, e.g. CLA 142, 202.
- A course surveying the literature and/or mythology of the ancient world, e.g. CLA 135, 140.

A senior project is required, demonstrating students’ ability to meaningfully interpret an ancient text or texts, read in the original language; it may be completed as part of a senior thesis or in conjunction with the junior/senior seminar or other appropriate course.

Minors in Classics

Minor in Latin
Six courses in Latin; may include LAT 101 and 102.

Minor in Greek
Six courses in Greek; may include CGR 101 and 102.

Minor in Classical Civilization
Six courses are required, including:

- A course focusing on the history of the ancient world, e.g., CLA 102, 115.
- A course surveying the literature and/or mythology of the ancient world, e.g. CLA 135, 140.
- Four additional courses, which may include language courses as well as courses in translation; 101 and 102 courses in the languages may count.

Minor in Arabic

- ARA 101 and 102, or the equivalent.
- Four courses of close textual analysis and interpretation, chosen from a wide range of Arabic texts, and read in the original language.

Upper-Level Writing Requirement

The Department of Religion and Classics is committed to teaching students to think critically, read closely, and write in a clear and cogent style. The department requires students majoring in religion or classics to undertake a significant amount of writing in courses contributing to their major. As a result, the upper-level writing requirement will be fulfilled by virtue of completing the requirements for either a major in religion or a major in classics.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

RELIGION

101. Introduction to the Old Testament.
Examination of the Old Testament/Hebrew Bible in Ancient Israel in its religious, historical, and literary contexts.

Examination of the New Testament in its religious, historical, and literary context.

103. History of Judaism.
An introduction to the religious and cultural development of Judaism. Will emphasize Judaism as a living tradition, one which has been subject to both continuity and change among its practitioners throughout its history.

104. History of Christianity.
The development of Christianity throughout its twenty centuries of existence.

The basic teachings of Hinduism and Buddhism as to human nature and the paths to liberation.

106. From Confucius to Zen.
The teachings, practices, and social impact of the major religious traditions of China and Japan.

107. History of Islam.
The development 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.

Advanced-Introductory Thematic Courses

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.
135. Classical Mythology.
The major myths of the classical gods and heroes using readings in translation and visual images.

140. Classical and Scriptural Backgrounds.
The great tradition, from Homer, Greek drama, Plato, and Virgil to the bible and Dante.

142. The Ideas of the Greeks.
A study of the major literary, philosophical, religious, and historical themes, and ideas from Homer to Aristotle.

The themes of love and sex, comedy and adventure, that have given this classic of world literature its universal appeal and timeless relevance.

149. Contemporary Fiction from the Arab World.
This course introduces the students to major Arab authors of contemporary novels and short stories in excellent translations.

151. The Blues.
The origins of the Blues in the context of African-American culture in the late 19th and early 20th centuries, its rapid rise to becoming the dominant popular music in the African-American community, and the discovery of blues by white audiences.

The American religious experience, from Native American religions, to Protestant, Catholic, and Jewish religious groups, to Mormonism and other religious movements in Upstate New York.

Religious history of “The Black Church” as well as other religions of the African diaspora, including Nation of Islam, Rastafarianism, Spiritualist churches, and Santeria.

162W. Mysticism.
Ancient and contemporary views of the nature of mystical experience and the quest for it as well as mysticisms impact on religion, art, and society.

164. Death, Dying, and Beyond.
Death and after-death states, especially as described in Asian religions, and the influence of ideas about death on construction of identity, cosmology, and ultimate meaning.

167W. Speaking Stones.
An examination of grave stones and funerary architecture in Rochester’s Mt. Hope cemetery with a focus on symbolic connections among the living and the dead.

171. Storytelling in Indian Religion.
This course focuses on a wide variety of stories taken from the Hindu, Buddhist, and Jain religious traditions.

178. Culinary Conversions.
American food traditions as elements of personal and communal religious identity.

A thematic introduction to the relationship between Jews and American entertainment media from the turn of the 20th century to today. Will address Jewish experience in radio, Hollywood, theater, and television, as well as popular print culture such as comic books.

188. Nineteenth-Century Religion in Western NY.
Charles Finney named the region of Western New York the “Burned over District” for the proliferation of religious fervor that swept this section of New York State. The course covers religious movements formed in the area surrounding Rochester, including Jehovah’s Witnesses, Mormons, Millerites, and the Onieda Community.

Quest Courses

192Q. Quest for the Historical Jesus.
The attempts of the earliest Christians and of modern scholars to reconstruct the life and teachings of Jesus.

193Q. Divine Comedy of Dante Alighieri.
Students learn how to approach Dante’s poetry as a vehicle for thought, an instrument of self-discovery, and a way to understand and affect the historical reality.

197Q. Dante’s Divine Comedy I.
Students gain a perspective on the Biblical, Christian, and Classical traditions as well as on the political, literary, philosophical, and theological context of medieval Europe.

198Q. Dante’s Divine Comedy II.
This course is the second segment of a two-semester sequence on The Divine Comedy. The purpose of the sequence is to introduce students to the liberal arts through one of the most significant texts in Western civilization.

Religion in the Ancient World

A close study of several Platonic dialogues (Phaedrus, Lysis) and their themes, especially the relation of eros and speech to divinity.
204. Ancient Roman Religion.
This course explores the religion of the ancient Romans from the time of the founding of the city of Rome in the eighth century BC to the end of the Roman imperial period in the fifth century AD.

207. Women in Early Christianity.
In this seminar, we will examine ancient Christian sources from the first four centuries CE that focus on women’s lives and women’s religious experiences. Topics include: the debates over women’s religious authority, the prominence of female martyrs, the relationship between women and heresy, virginity and sexual renunciation, the Christian family, forms of female asceticism and Christian holy women, and the role of women in the ‘rise’ of Christianity.

208. Medicine, Magic, and Miracles.
Study of the concepts of disease and of healing practices in antiquity among Christians and pagans, the rise of the medical profession, and contemporary and ancient debates about science, magic, and religion.

Religious conflict in the ancient world.

Judaism Courses

An examination of the history and literature of the varieties of Judaism in the Greco-Roman world from the time of the Babylonian Exile until the destruction of the Second Temple and its aftermath.

214. Imagining the Jew.
Popular representations of Jews and their influence on Jewish acculturation, Americanization, and continuity.

216. Jews and Multiculturalism in America.
Jewish immigration in the United States and the ways in which these immigrants chose to acculturate (or not).

The music of Judaism and the Jewish people from the earliest times until the present and the role of music in shaping the character of Jewish historical, religious, and cultural experience.

218. The Holocaust.
THE EVENT: Jews in Nazi Germany, the concentration camp; the Nazi ghetto; the death camps; uprising and resistance. ANTECEDENTS: The historical development of Anti-Semitism and the nature of totalitarianism; German political and cultural history of the 19th-20th centuries; the place of the Jewish minority in Europe. MEANING: Survival in theology, literature, and politics; theological and historical interpretations of the Holocaust; the problem of evil.

220. Jewish Women’s Writings.
The American Jewish experience, from the Eastern European immigrant experience to the recent religious revival, through the lens of Jewish women’s literature.

Christianity Courses

227. Ancient Christianity.
The rise of early Christianity from a persecuted minority religious movement to the dominant religion of the Roman Empire.

228. Body in Early Christianity.
Though we often assume that religion deals with the spirit or the soul, the earliest Christians were deeply and primarily concerned with the body. In this course, we examine the multiple and various early Christian debates and practices relating to the body focusing in particular on issues related to physical suffering, death, sexuality, identity, and asceticism. Topics include: early Christian debates over the nature of the body and its relationship to personal identity and the nature of the self; conflicting ideas about the nature of Jesus’ incarnated, crucified, and resurrected body; gender, sexuality, and the bodies of men and women; Christian valorization of physical suffering and the bodies of the ill; the cult of the martyrs and the cult of the relics; the rise of asceticism and the bodies of saints. Theoretical readings (Foucault, Turner, Brown, Douglas) complement our reading of primary sources.

229. Aquinas.
The natural theology of Thomas Aquinas.

230. Augustine, Anselm, and Aquinas.
Three formative philosophical treatments of religious belief on such topics as the existence of God, freedom, providence, and evil.

231. Christian History I.
The origin and evolution of Christianity, juxtaposing Christian belief and behavior with historical circumstances.

232. Christian History II.
The history of the western Christian churches, Catholic and Protestant, from the Reformation in 1517 to the present diversity.

233. Christianity and the Social Order.
Varied paradigms of Christianity’s relationship with the social world, from early Christianity to the present.

234. Cry Freedom.
The principal ideas of various liberation theologians—Latin American, Asian, African, Afro-American, and feminist. We will also examine the social worlds in which they think and write, thus trying to see the connection between their ideas and the social environments they want to liberate.
**235. Religion and Society in Latin America.**
Cultural and political relationships between religion and Latin American societies, from pre-Conquest religious systems and their continued presence in indigenous people to the symbiotic relation between church and state in Mexico, Peru, and Bolivia.

**236. Catholicism in American Life.**
History of Catholic Christianity over five centuries from its origins as a colonial religion to its entrance into the mainstream of American life.

**Islam Courses**

**240W. Muhammad and 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.

**241. Qur’anic Arabic.**
Selections from the Qur’an, with discussion of religious, literary, and historical dimensions of the text.

**243W. 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.

**244. Islamic Mystical Poetry.**
In this course students read and analyze Islamic mystical verse in English translation largely from Arabic, Persian, Turkish, and Urdu. Following an intensive introduction to Islamic mysticism, specific poems are studied with particular attention given to the religious contents and functions of this verse and to its place within its respective poetic tradition.

**247. Islam and the Third World.**
Effects of Third World political, social, and economic factors on contemporary Islam. Case-studies will be drawn from contemporary Muslim societies, with particular attention to the subjects of Muslim women, the rise of Islamic movements in the 20th-21st centuries, and instances of global religious violence involving Muslims.

**248. Islam and Global Politics.**
The response of the Islamic world to European colonialism and American foreign policy.

**274. Culture and Religion: Indian Ocean.**
The transformations of the world religions during the colonial and post-colonial periods in the countries bordering the Indian Ocean.

**Hinduism Courses**

**252. Heroines and Heroes.**
A comparative study of the heroic concept in light of Indo-European mythologies, particularly stories from the Sanskrit and Greek traditions.

**255. Hindu Goddesses and Women.**
Ways in which women understand themselves as Hindus and the ways in which they have been understood.

**260. Hindu Ascetics, Mystics, and Doctors.**
A close study of Hindu traditions focused on the theories and practices of esoteric Yoga, Tantra, and medicine.

**261. Hindu Tantric Yoga.**
An advanced introduction to the mysticism of the Hindu Tantras. Additional readings explore its historical and philosophical dimensions.

**Buddhism Courses**

**266. Buddhist Philosophy.**
Major developments in Buddhist thought and practice through study of key figures in Indian, Southeast Asian, Tibetan, and East Asian traditions.

**269. Tibetan Buddhism.**
Cultural and historical development of Buddhism in Tibet.

**283. The Culture of Zen.**
Buddhism was the most important element shaping the culture of medieval Japan. This course examines the doctrines and the monastic and worldly practices of Zen Buddhism as they shaped the daily life, literature and drama, art and architecture, calligraphy, interior decoration, and tea ceremony of the period.

**Religion in Art and Literature**

**238. Native American Art and Religion.**
Case studies in Native American cultures where the visual arts articulate religious and philosophical systems of thought.

**278. Art and Culture of Eastern Christianity.**
This course examines Christian art in its cultural context in Eastern Europe, the Near East, and the Slavic world. The main theme will be the art of the Byzantine Empire centered in Constantinople until 1453, but in addition, we will look at developments in Post Byzantine Greece, the Balkans, Bulgaria, Kievan Rus’, Armenia, and Georgia.
279. Romanesque Art and Architecture.
This course explores the origins, development and regional manifestations of western European art and architecture of the Romanesque period (11th and 12th centuries AD). The first half of the course includes an introduction to the history of the period and the methods of analysis of sculpture, painting, and architecture. In the second half, there will be class discussions of specialized topics and interpretive problems stressing reading and visual analysis.

281. British Art of Middle Ages.

282. Divine Comedy of Dante Alighieri.
Students learn how to approach Dante’s poetry as a vehicle for thought, an instrument of self-discovery, and a way to understand and affect the historical reality.

285. Dante’s Divine Comedy I.
Students gain a perspective on the Biblical, Christian, and Classical traditions as well as on the political, literary, philosophical, and theological context of medieval Europe.

286. Dante’s Divine Comedy II.
This course is the second segment of a two-semester sequence on The Divine Comedy. The purpose of the sequence is to introduce students to the liberal arts through one of the most significant texts in Western civilization.

288. Chaucer.
The principal works of Chaucer, in their historical and intellectual context. Readings in Middle English.

Methodological and Philosophical Courses

291. Topics in Philosophical Theory.
A seminar devoted to a selected topic in philosophy of religion. Same as PHL 260/460.

292. Marx, Nietzsche, and Freud.
This course examines the views of Marx, Nietzsche and Freud on religion. Each of these three thinkers developed a radical critique of religion that was a vital part of his thought, and echoes of their views continue to be heard in contemporary debates about religion. We will discuss their explanations of the origins of religious ideas, the validity of their criticisms—most prominently that religion as such is now harmful to humanity—and how each man’s view of religion reflects larger concerns in his thought. Key concepts of each thinker, such as alienation (Marx), nihilism (Nietzsche), and neurosis (Freud), will be analyzed.

293W. Theories of Religion.
Methodological contributions to the critical study of religion. Required seminar for major and minor concentrators in religion.

297. The First Amendment and Religion in America.
The historical forces that led to the adoption of the religion clauses of the First Amendment, the subsequent development of those clauses (importantly through the close reading of key Supreme Court opinions), and religion’s role in modern American society.

Archaeology Courses

200. Introduction to Archaeology.
This course introduces the student to the field of archaeology through three units of study: 1) The history of excavation from ancient to modern times, 2) The techniques of excavation and the analysis of material remains, 3) Modern theories of cultural interpretation of archaeological sites.

299. Field Methods in Archaeology.
In this course, taught on site at an archaeological excavation, students receive instruction and hands-on training in archaeological field and laboratory work, including remote sensing in archaeology, on-site surveying, excavation techniques, field documentation, and artifact identification and processing.

300. Advanced Field Methods in Archaeology.
Students receive instruction and hands-on training in archaeological field and laboratory work, including remote sensing in archaeology, on-site surveying, excavation techniques, field documentation, and artifact identification and processing.

Advanced Courses and Seminars

309. The Celestial Song.
We will study and compare several translations of the Bhagavadgita, read traditional Sanskrit and vernacular commentaries in English translation, and study how this remarkable text has inspired, bemused, and generated myriad interpretations and competing theological schools.

310. Seminar in Mahabharata.
A study of the Mahabharata, the great Hindu epic, focusing on the symbolism of its narrative and the problems involved in its interpretation of myth and ritual.

389W. Senior Seminar.
This advanced seminar focuses on topics, methods, and theoretical models in the study of religion. Specific subjects are determined on a yearly basis.

390. Supervised Teaching.

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.
Honors Research.

Senior Project.
A directed, individual study project open to senior concentrators.

Internship.

CLASSICS

Arabic Courses

Elementary Arabic I.
An introduction to Modern Standard Arabic including the alphabet, pronunciation, vocabulary, grammar, elementary conversation, and reading.

Elementary Arabic II.
A continuation of ARA 101, with increased emphasis on reading comprehension of Arabic texts. Homework includes written exercises and text preparation.

Intermediate Arabic.
Continuation of the sequence of introductory Arabic courses. Readings and oral and written exercises introduce students to more complex sentence structures, and there is an increased emphasis on vocabulary building.

Intermediate Arabic II.
A continuation of ARA 103.

Colloquial Egyptian Arabic.
Through role-playing, songs, films and a transliterated text, students in this course will learn basic grammar and vocabulary enabling them to conduct simple conversations and carry out day-to-day activities. No previous knowledge of Arabic is required.

The Arabian Nights.
The themes of love and sex, comedy and adventure, that have given this classic of world literature its universal appeal and timeless relevance.

Contemporary Fiction from the Arab World.
Major Arab authors of contemporary novels and short stories in excellent translations.

Arabic Prose Seminar I.
Intensive readings to increase vocabulary. Weak verbs and conditional sentences complete the study of grammar.

Arabic Prose Seminar II.
Intensive readings to increase vocabulary. Weak verbs and conditional sentences complete the study of grammar.

Arabic Prose Seminar III.
Content varies; offered upon request.

Qur’anic Arabic.
Selections from the Qur’an, with discussion of religious, literary, and historical dimensions of the text.

Supervised Teaching.

Independent Study.

Greek Courses

NOTE: Greek 101 and 102, or the equivalent, are prerequisites to all Greek courses at the 200 level.

New Testament and 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.

New Testament and Classical Greek II.
A continuation of CGR 101.

Intermediate Greek I.
Review of Greek grammar and readings in an unadapted prose text.

Intermediate Greek II.
Continuation of CGR 103.

Homer’s Odyssey.
A study, translation and discussion of selections from Homer’s *Odyssey*. Special attention given to meter and the poetic aspects of Homeric Greek.

Sophocles.
A close-reading of Sophocles’ *Oedipus the King* in ancient Greek, and *Oedipus at Colonus* and *Antigone* in translation. Attention will be paid to Sophoclean meter (especially iambic trimeter) and scholarship, focusing primarily on the key historical and literary question surrounding his work.

Aristophanes Lysistrata.
A close reading of Aristophanes’ *Lysistrata* in ancient Greek. Attention will be paid to meter and scholarship, focusing primarily on the key historical and literary questions surrounding Aristophanes’ work.

Plato’s *Meno*.
Translation and close study of Plato’s *Meno*. Skill in translating and advancement of the knowledge of Greek is stressed.
210. Euripides.
An exploration of the language and thought of Euripides through a reading of one of his best-known plays, either the Medea, Hippolytos, Bacchae, or Alcestis.

390. Supervised Teaching.

391. Independent Study.

393. Senior Project.

Hebrew Courses

101. Elementary Hebrew I.
Introduction to the structure of Modern Hebrew. Practice in vocabulary, use, grammar, reading, and writing.

102. Elementary Hebrew II.
Direct continuation of Hebrew 101 with emphasis on enhancing reading, writing, and speaking skills.

103. Intermediate Hebrew.
Continuation of HEB 102 with emphasis on enhancing reading comprehension and writing and speaking skills. Students are expected to have good understanding of the structure of Hebrew including familiarity with verb forms.

204. Hebrew through Conversation.
This is a fourth semester course in the Hebrew language series designed to enhance and advance conversational skills using various sources including Israeli newspapers, Hebrew stories, and topical discussions based on students' interests and Israeli life.

205. Hebrew through Conversation.

Survey the military, political, and social history of ancient Greece from the Bronze Age to the death of Alexander.

This course, the third in the introductory sequence, consists of readings from a selection of Latin prose and poetry with accompanying grammar review.

204. Catullus.
A close study of the poems of Catullus.

206. Virgil.
A study of Virgil's Aeneid. Concentration on translation and interpretation of the work and improving linguistic and critical skills in the student.

207. Lucretius.
Selections from Lucretius' philosophical poetry.

This course examines representative works of the Roman orator, philosopher, and statesman Cicero, whose writings greatly influenced the development of Latin prose.

217. Livy and Tacitus.
Translation of selections of the writings of the Roman historians Livy and Tacitus, with attention to understanding their use of language and syntax as well as the social and historical setting in which the authors themselves lived and wrote.

220. Plautus and Roman Comedy.
A study and translation of one whole play of Plautus and passages from several others.

221. Medieval Latin Prose.
Introduction to a variety of Medieval Latin texts. Students complete independent studies of an author or topic of their choice.

250. Latin Skills.
Focus is on the development of listening, speaking, and writing skills for Latin students and prospective teachers.

Classical Studies

102. Cultural History of Ancient Greece.
Survey the military, political, and social history of ancient Greece from the Bronze Age to the death of Alexander.
115. Roman World.
This course offers a comprehensive account of the history of Rome.

135. Classical Mythology.
Introduction to the major myths of the classical gods and heroes using readings in translation and visual images.

140. Classical and Scriptural Background.
The great tradition, from Homer, Greek drama, Plato, and Virgil to the Bible and Dante.

142. The Ideas of the Greeks.
A study of the major literary, philosophical, religious, and historical themes, and ideas from Homer to Aristotle.

200. Introduction to Archaeology.
This course introduces the student to the field of archaeology through three units of study: 1) The history of excavation from ancient to modern times, 2) The techniques of excavation and the analysis of material remains, 3) Modern theories of cultural interpretation of archaeological sites.

A careful and thorough line by line study of Plato’s *Phaedrus* and *Symposium* with a view to understanding each dialogue in itself and Plato’s philosophic art of poetic composition. Some major themes in Plato will be intensively explored, such as *The Soul* and its part, the immortality of *The Soul*, the nature of learning, *Eros* and philosophic passion, and others. Mostly discussion.

204. Engineering and Society in Antiquity.
This course explores the relationship between, on the one hand, engineering and technological advances and, on the other hand, social practices in ancient Greece and Rome.

209. Ancient Roman Religion.
This course explores the religion of the ancient Romans from the time of the founding of the city of Rome in the eighth century BC to the end of the Roman imperial period in the fifth century AD.

Roman civil engineering structures, focusing on mechanics, hydraulics, and materials as used in antiquity.

214. The Ancient City.
Urbanism in the ancient Mediterranean world. Survey of the rise of cities in the Near East and Egypt and detailed study of the cities and colonies of ancient Greece and the Roman Empire, using the evidence of archaeological remains.

216. Ancient Epic.
Close readings of the *Iliad*, the *Odyssey*, and the *Aeneid* will be supplemented by critical texts that examine the tremendous social and civic import of epic in antiquity and the broader cultural contexts in which the genre flourished. The significance of the epic singer, the distinction between oral and written compositional techniques, and notions of gender, class, and empire in the ancient world will be topics of investigation that inform our reading of the epic texts.

This course examines the physical remains of ancient Greek civilization, with an emphasis on architecture, sculpture, painting, and other visual arts, in order to understand Greek culture and society.

An examination of the physical remains of ancient Roman civilization, with an emphasis on architecture, sculpture, painting, and other visual arts, in order to understand Roman culture and society.

This course explores: theories about the roles of race, language, and culture in the construction of identity; the relative usefulness of historical and archaeological methodologies in attempts to understand past conceptions of identity; ethnic identity and the ethnic groups of the ancient Greek and Roman worlds as presented by specific ancient texts and archaeological remains; and the ways in which modern and contemporary ethnic issues have influenced the study of classical antiquity.

299. Field Methods in Archaeology.
In this course, taught on site at an archaeological excavation, students receive instruction and hands-on training in archaeological field and laboratory work, including remote sensing in archaeology, on-site surveying, excavation techniques, field documentation, and artifact identification and processing.

300. Advanced Field Methods in Archaeology.
Students receive instruction and hands-on training in archaeological field and laboratory work, including remote sensing in archaeology, on-site surveying, excavation techniques, field documentation, and artifact identification and processing.

In this class students will develop projects focused on Latin or Greek texts of their own choosing based on a particular theme.

390. Supervised Teaching.

391. Independent Study.

392. Honors Research.

393. Senior Project.

394. Internship.
Russian Studies

**Professor**

Kathleen Parthé, PhD (Cornell)
*Professor of Russian*

**Associate Professor**

John Givens, PhD (Washington)
*Associate Professor of Russian*

Matthew E. Lenoe, PhD (Chicago)
*Associate Professor of History*

Randall Stone, PhD (Harvard)
*Associate Professor of Political Science*

**Senior Lecturer**

Laura Givens, MA (Washington)
*Senior Lecturer in Russian*

Anna Maslennikova, PhD (St. Petersburg)
*Senior Lecturer in Russian*

Russian studies offers students a program that incorporates the perspective of several disciplines and the linguistic, historical, and cultural background needed to understand Russia’s past, to analyze its present, and to make responsible predictions about its future. The three departments and disciplines providing the core faculty for this program are modern languages and cultures, history, and political science, but a Russian studies major or minor includes courses in or cross-listed with art history, religion and classics, Judaic studies, Polish and Central European studies, film and media studies, women’s studies, comparative literature, and economics.

The Russian studies curriculum, like Russia itself, is seen as a work in progress, and new courses are added and old ones revised to reflect new knowledge in this area, and the changing opportunities for graduates of the program. Recent additions to the roster of courses include Russia Now, Secret Nation, Russian Art, Russian Drama, Russia Goes to the Movies, The Image of Christ in Russian Literature, and Russia to 1692. There are numerous cocurricular activities throughout the year designed to meet the needs and interests of majors and minors, but open to the entire College community.

In addition to the course of study on the Rochester campus, students majoring or minoring in Russian studies take part in the one-month summer program in St. Petersburg, or an approved semester-long program in Moscow or St. Petersburg. Each year students are involved in area-related summer or semester internships in Washington, D.C., or Russia. Graduates have gone on to law school and other postgraduate study, to positions in non-government and government agencies in Washington, and to U.S. businesses with branches in Moscow and St. Petersburg.

Russia has a history and culture that go back more than a millennium, while its political and economic structures are less than two decades old. The Russian studies program prepares students to not only know about this area, but to work in and with it at this time of transition.

In addition to the Russian studies major and minor, the program also offers clusters in the humanities and one in the social sciences, and several of its courses count towards the major in International Relations. For further information on the Russian major and minor requirements, and on the summer study program in St. Petersburg, consult the Department of Modern Languages and Cultures.

The Russian studies major is an interdisciplinary program designed to provide students with a background in Russia, the former Soviet Union, and Central and Eastern Europe. The course of study is based on a working knowledge of the Russian language, combined with the study of Russian history, literature, film, religion, art, political science, and economics. Successfully completing a major enables students to do independent analysis of events in Russia and surrounding regions.

A major in Russian studies can be designated as belonging either to the humanities or social sciences, depending on the students’ interests and course choices. Students frequently combine a Russian studies major with a second major in political science, history, or another discipline.

### BS in Russian

- Proficiency in Russian, which can be demonstrated in several ways, but which is generally the equivalent of coursework through RUS 152.
- Two courses in Russian literature and two in Russian history; it is highly recommended that at least one of the literature and one of the history courses be a survey.
- Two courses in political science which cover basic concepts of international relations or have a specific focus in this area.
- A senior thesis.
- Upper-level writing requirement: majors take the writing section of two Russian studies courses or one such course plus the senior thesis.

Language training in Russia is strongly encouraged, either through the University of Rochester’s summer program in St. Petersburg, or one of several recommended semester-long programs.

### Minor in Russian

The minor in Russian studies can be designated as belonging either to the humanities or social sciences, depending on the students’ interests and course choices.

The minor requires a reading knowledge of Russian (151 or the equivalent) plus five courses: (a) a survey course in history/culture, and a survey in literature (for a total of two courses); (b) one course each in a more specialized area of history, literature, or art (two courses in all); and (c) a course in political science or economics which enriches the study of this region.

### Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.
COMPARATIVE LITERATURE

160. The New Europe: Formations and Transformations.
161. Europe Today.

HISTORY

151. Imperial Russia.
This course examines the history of the Russian Empire from the reign of Peter the Great (1692-1725) to the revolutions of 1917. Students will read primary sources in translation, academic articles, and a survey text. About one-half of class time will be devoted to discussion of the readings. Topics will include Peter’s westernization of Russian elites and the costs thereof, the Pugachov rebellion of 1773-1775, the spread of Enlightenment ideals to Russia during the Napoleonic Wars, the abolition of serfdom, Sergei Witte’s industrialization drive, socialist movements in Russia, World War I, and the causes of the revolutions of 1917.

152. Soviet Russia.
This class examines the history of the Soviet Union from foundation (1917) to collapse (1991), focusing on internal developments in the Russian part of the Union. We will begin with a discussion of the background to the collapse of the imperial Russian state in 1917, including changes in Russian society and World War I. Later, the class will look at questions such as: Did the New Economic Policy of the 1920s create a stable socioeconomic order? How did Stalin defeat his political rivals and create a personal dictatorship? What were the motivations for the Great Terror of 1937-1938? How did the Soviet Union defeat Nazi Germany in World War II? We will also devote some time to the Soviet role in the Cold War and the appeal of Leninism in colonized and post-colonial societies. The course will conclude with a discussion of the collapse of the USSR and the emergence of a soft authoritarian order in post-Soviet Russia. The syllabus will emphasize primary-source readings and class discussion.

155. History of Russia to 1692.
This course focuses on the history of Kievian Rus beginning with the official conversion to Byzantine Christianity (988), the period of Mongol rule over Russia, the rise of the city of Moscow to a dominant position among the Russian principalities, and Muscovite society, politics, and economics in the 1500s and 1600s. We will examine the origins of Russian serfdom and Russian autocracy, Muscovite relations with other societies, including England, the role of witches in Muscovite society, and many other topics. We will also be studying the history of the ‘Rus’ as it intertwines with the history of two neighboring Slavic peoples, the Poles and Ukrainians.

191. Russian Revolution.
293. Stalinism.
In this seminar we will read and discuss seminal works in the historical and literary literature about high Stalinism (1925-1953), from Koestler’s *Darkness at Noon* to Sheila Fitzpatrick’s *Everyday Stalinism*. Topics will include explanations for the Great Terror, origins of Stalinist culture, the degree of popular support for Stalinism, and the economics of forced collectivization.

330. Russia in East Asia.

POLITICAL SCIENCE

106. Introduction to International Relations.
Introduces students to the wide range of issues that make up the study of international relations, including the workings of the state system, the causes of international conflict and violence, and international economic relations.

272. Theories of International Relations.
How do we explain patterns of war and peace? Why do states with common interests often fail to cooperate? This course surveys theories of international relations, focusing on explanations of conflict and cooperation.

RUSSIAN

124. Background in Russian Studies.
Taught by a native speaker of Russian, this course is intended for those with a minimum of one year of college-level Russian. It is structured around Russian film and TV broadcasts and other authentic Russian-language materials. It offers students the chance to improve their comprehension and speaking skills. Those taking the course for 4 credits also work on additional written assignments in consultation with the instructor. Class taught in English.

126. Russia Now.
In this expanded 4-credit version of the 2-credit “Russia Now” course, students will follow current events in Russia through print and electronic sources, and write two short essays and one longer research paper.

128. Russian Civilization.
Russian Civilization from its beginnings a thousand years ago to the present day. Each unit will cover historical and cultural background as well as literary texts. We will examine important national “myths” (narratives with a variable connection to the historical record) that govern the Russians’ understanding of their history and culture, including: the Golden Age of Kiev, Moscow as the Third Rome, and the myths surrounding the city of Petersburg. We will analyze traditional tensions in Russian civilization which prevail today, such as those between: chaos and order, foreign influence and a strong national identity, innovation and tradition, and between radical skepticism and faith. Readings will include: Russian fairy tales and saints’ lives, excerpts from the autobiography of the 17th century heretic Avvakum, tales by Pushkin and Gogol, one of Dostoevsky’s most powerful and influential novels *The Devils/Possessed*, and a wide range of materials from the twentieth century. In English.
190. Tolstoy’s War and Peace.
A semester-long exploration of the world of War and Peace. The class works its way through the novel (in English) over the term, while looking at materials that “unpack” it, including historical accounts of the same events and attempts by Russian, English, and American directors to capture the essence of the novel on film.

222. Russian Drama.
Introduces the Russian theater in its cultural and political context, with close readings of plays from the late 18th century to the late 20th century by Catherine II, Gribodov, Gogol, Ostrovsky, Tolstoy, Chekhov, Kharmas, Bulgakov, and others. In English.

224. Russian Art.
The history of Russian art and architecture from the Christianization of Russia through the twentieth century. Students learn how to read icons, discern the major features of Russian churches, and follow the development of Russian painting from the age of realism to modern times. In English.

229. St. Petersburg in Russian Culture.

231. Great Russian Writers.
A survey of nineteenth century Russian literature from the end of romanticism through the rise of realism and the advent of modernism. We read Pushkin’s Eugene Onegin, Lermontov’s Hero of Our Time, Gogol’s Dead Souls, Tolstoy’s Anna Karenina, and two plays by the forerunner of modern theater, Anton Chekhov. In English.

237. Dostoevsky.
We unpack the writer’s life and art through close readings of his major works, including Poor Folk, Letters from the House of the Dead, Notes from Underground, Crime and Punishment and Brothers Karamazov. In English.

In fiction, Ivan Denisovich, First Circle, and non-fiction, Gulag Archipelago, The Oak and the Calf, Alexander Solzhenitsyn witnessed history and changed it.

243. Chekhov and His Contemporaries.
The climax of Russian civic, lyric, and psychological realism in the works of Chekhov, Tolstoy, Bunin, Gorky, and others. Symbolism as a reaction to realism and as the beginning of literary modernism in Russia.

246. Image of Christ in Russian Literature.
The image of Christ has dominated Russian art and culture for a thousand years. Indeed, it may even be argued that Russian literature began with Jesus Christ, for in its earliest forms—the numerous accounts written of saints’ lives—it dealt with little else than living in accordance with the words and deeds of Christ. After briefly setting the context, the course focuses on the nineteenth and twentieth centuries, exploring the extraordinary range of poetic encounters with the figure of Jesus in works by Tolstoy, Dostoevsky, Aleksandr Blok, Anna Akhmatova, Mikhail Bulgakov, Boris Pasternak, and Venedikt Erofeev.

247. Secret Nation.
The cult and culture of secrecy in Russia from Ivan the Terrible to the present. Russia was always an enigma, as tsarist and Soviet governments gathered and controlled information. The Russian people kept information from the government, and foreign states sent out disinformation of their own about Russia. There was an active underground in religion, literature, politics, the economy, and other areas. With glasnost, Gorbachev began the process of uncovering secrets from above, and a freer press began to do the same from below. We use materials from history, religion, literature, film, political science, and economics, to get a richly detailed picture of the information that was hidden, and the means by which this was accomplished. Official secrecy that was originally a defensive move came to undermine the state it sought to protect. At the end of the semester we see to what extent old habits of secrecy persists in Russia today. The course is taught in English.

This course examines how culture, ethnicity, and politics intersect in 20th-century Russian literature. We begin with excerpts from Dostoevsky’s Diary of a Writer, sacralizing Russianness and demonizing Jews. Political and artistic avant-gardes 1900-1930 are analyzed for their attempts to overcome traditional ethnic divisions. In Stalin’s Russia an international Soviet identity was replaced by a Russian state culture, which put “cosmopolitanism” on trial after World War II. A secular Russian cultural identity was the norm until the state withdrew from the cultural sphere in the late 1980s, but Russian Jewish emigre literature was available to many readers through unofficial channels. We end with the battle of competing identities in post-1985 Russia. Readings include: Dostoevsky, Babel, Grossman, Mandelstam, Pasternak, Rozin, Tertz, Markish, Rasputin, and Brodsky. In English.

265. Russian Literature between the Revolutions.
A survey of emblematic stories and novels of the Soviet period, including works describing the first decade of the new regime, a Socialist Realist classic of the 1930s, literary tributes to Stalin, a manuscript that “would not burn” and important post-Stalin works that anticipate the literary renewal of the immediate post-Soviet period. In English.

267. Russia Goes to the Movies.
The dawn of the age of movies coincided with the Russian Revolution, and film was Lenin’s favorite art form. The course surveys Russian film from the beginnings to the present. The course investigates the major role that cinema played in shaping the national and political identity of the Soviet Union, and
looks at what was artistically interesting and popular about these films, some of whose directors, like Eisenstein and Tarkovsky, are among the world’s most influential filmmakers.

289. Dangerous Texts.
When modern Russian literature began to evolve in the mid-1600s, the printed or written text was immediately seen as a potential danger to the power of Church and State. In this course we will examine dangerous texts’ from the 17th century to the present to see what aspects of texts and their authors were seen as threats and how these threats were dealt with. We will also see the ways in which writers did indeed perceive themselves as a second government’ and how this changed the way they wrote. The reading list will include works by: Avvakum, Radisheev, Pushkin, Lermontov, Gogol, Turgenev, Dostoevsky, Tolstoy, Babel, Mayakovsky, Mandelstam, Pasternak, Yevtushenko, Solzhenitsyn, Voinovich, Grossman, and Sinyavsky/Tertz. The goal of this course is to arrive at an understanding of the unique role played by literature in Russian history. In English.

Sociology

Professor

Thomas Spence Smith, PhD (Chicago)
Professor of Sociology

Raymond Murphy, PhD (Northwestern)
Professor Emeritus of Sociology

Though the College offers several courses in sociology each year, there is no department of sociology, and therefore no major or minor in sociology. Students 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 Center for Study Abroad and Interdepartmental Degree Programs. 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
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

INTRODUCTORY COURSES

101. Introduction to Sociology.

SOCIOLOGICAL THEORY

205. Microsociology.
Intensive study of semester-long self-analytic groups. Small group and individual interaction. Theories of interaction, small group processes, conversation analysis, narrative interpretation.

206. Advanced Microsociology.
Theories of interaction, small group processes, conversation analysis, narrative interpretation. Intensive study of semester-long self-analytic groups. Students may take both SOC 205 and 206.

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.
262. Medical Sociology.

310K. Social Net Theory and Entrepreneurial Activity in Silicon Valley I.
Network theory is at the forefront of an emerging collaboration among academics, with many new and interesting interdisciplinary implications, especially those for entrepreneurship.

311K. Social Network Theory and Entrepreneurial Activity in Silicon Valley II.
Designed for students who have already taken SOC/ANT 310K. It aims to deepen and extend skills in the same areas for which 310K was an introduction to social network theory and the new sociology of business and entrepreneurial activity.

Statistics

Professor
Govind Shrikrishna Mudholkar, PhD (North Carolina)
Professor of Statistics
S.R.S. Rao Poduri, PhD (Harvard)
Professor of Statistics; Director of the Program in Statistics

Associate Professor
Charles Heckler, PhD (Rochester)
Adjunct Associate Professor in Statistics

Instructor
Maria McDermott, MA (Rochester)
Adjunct Instructor in Statistics
Nicholas Zaino, MA (Rochester)
Adjunct Instructor in Statistics

The Program in Statistics offers a major and a minor. A double major with statistics and a joint major in mathematics and statistics are also available. For further information, please contact Professor S.R.S. Rao Poduri, director of the Program in Statistics.

Introduction to statistical methods and applications is provided by STT 211, 212, or 213; to probability by STT 201; and to statistical theory and inference by STT 203. STT 216 is an intermediate-level course in applied statistics. Computer software packages are integrated into the applied and some of the advanced courses.

BA in Statistics

- MTH 161 and 162 or their equivalents (141–143).
- 10 additional courses:
  - Six to eight statistics courses, including STT 212 or 213 (or 211), 201, 203, and 226W.
  - Two to four courses in an allied field, such as computer science, economics, mathematics, political science, and psychology.

In addition: CSC 171 or EE 171 or STT 277–278 or equivalent.

Double Majors

The above requirements are also needed for the double majors—statistics and another field such as economics, mathematics, political science, and psychology. Approvals of both the departments are required. Not more than three courses can be duplicated for the two majors.

Joint Major in Mathematics and Statistics

MTH 161, 162, 164, 165, and 235 (or 173); MTH or STT 201, 202, 203, and 208; STT 226W; two additional 200-level courses in mathematics and/or statistics; CSC 171 or EE 171 or STT 277–278 or equivalent. Approvals of the advisors in both the programs are required.
Minor in Statistics
A total of five courses is required:
- STT 201.
- STT 203.
- STT 211 or 212 (or 213).
- At least one of the following:
  STT 216.
  STT 226W.
- At least one elective from the offerings of the program or computing courses, such as CSC 171 or EE 171 or STT 277–278 approved by the statistics program advisor.

Upper-Level Writing Requirement
Statistics majors: STT 226W and STT 221W; STT 216 with a project may be substituted for one of these courses.
Joint mathematics/statistics majors: an MTH xxxW course may be substituted for one of the above courses.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

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 or 162. Same as MTH 201.

(Same as MTH 202.)
Prerequisite: STT 201.
Theory and applications of random processes, including Markov chains, Poisson processes, birth-and-death processes, random walks.

203. Introduction to Mathematical Statistics.

211. Applied Statistics for 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. Excel, Minitab and similar programs. Please note that, because of the significant overlap between them, students may earn degree credit for only one of these courses: BCS 200, CSP/PSI 211, STT 211 and STT 212.

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. Excel, Minitab and similar programs. Please note that, because of the significant overlap between them, students may earn degree credit for only one of these courses: BCS 200, CSP/PSI 211, STT 211 and STT 212.

Descriptive statistics; probability; binomial, Poisson, normal distributions; estimation of means, proportions, and their differences; confidence limits; tests of hypotheses; chi-square tests of association; introduction to regression analysis.

216. Applied Statistics II.
Continuation of STT 211 or 212. Analysis of variance, regression, correlation contingency table analysis, and associated topics. Excel, Minitab and similar programs.

221W. Sampling Techniques.
Prerequisite: familiarity with the concepts of expectation, variance, covariance, and correlation.

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. Excel, Minitab and JMMP and SAS and similar programs.

226W. Introduction to Linear Models.
Simple linear, multiple, and polynomial regression methods and applications; ordinary and generalized least squares, estimation, tests of hypotheses, and confidence intervals, and simultaneous inference, and computer packages. Computer programs including JMP and SAS.

Methodology and applications of multivariate analysis. Hotelling’s T-square, multivariate regression and analysis of variance. Classification and discrimination. Principal components, clustering, multidimensional scaling. Computer programs including JMP and SAS.

277. Introduction to Statistical Software I.
Credits—2 hours
STT 277 and the companion course, STT 278, are an introduction to statistical computing using software specifically engineered for that purpose. It is strongly recommended that students register for both courses. STT 277 covers the elements
of programming in R and SAS, and the operation of the JMP graphical user interface. The student will learn how to get data into (and out of) these programs, execute fundamental statistical procedures, and write programs in R and SAS to document and automate analyses.

278. Methods of Data Analysis.
Credits — 2 hours
Explores the use of software introduced in STT 277 to understand data from observational studies. The student will learn the philosophy, capabilities, and pitfalls of exploratory data analysis. Graphical methods will be emphasized, but numerically oriented procedures such as linear models will be included where appropriate. Each student will analyze a real-life data set in some depth and write a report.

390. Supervised Teaching.

391. Independent Study.

394. Internship in Statistics.

In addition, some 400-level courses are available to qualified undergraduates through the Department of Biostatistics.

Visual Science

Professor

Richard N. Aslin, PhD (Minnesota)
William R. Kenan Professor of Brain and Cognitive Sciences, Professor of Brain and Cognitive Sciences and in the Center for Visual Science; Director, Rochester Center for Brain Imaging

Gregory DeAngelis, PhD (California, Berkeley)
Professor of Brain and Cognitive Sciences, of Biomedical Engineering, of Neurobiology and Anatomy, and in the Center for Visual Science; Chair of the Department

Charles J. Duffy, PhD (Johns Hopkins)
Professor of Brain and Cognitive Sciences, of Neurology, of Neurobiology and Anatomy, of Ophthalmology, and in the Center for Visual Science

Steven Feldon, MD (Albert Einstein College of Medicine)
Professor of Neurology, of Ophthalmology, and in the Center for Visual Science

James R. Fienup, PhD (Stanford)
Robert E. Hopkins Professor of Optics, of Electrical and Computer Engineering, in the Center for Visual Science, and Senior Scientist in the Laboratory for Laser Energetics

Robert A. Jacobs, PhD (Massachusetts)
Professor of Brain and Cognitive Sciences, of Psychology, of Computer Science, and in the Center for Visual Science

David C. Knill, PhD (Brown)
Professor of Brain and Cognitive Sciences, of Computer Science, and in the Center for Visual Science

Wayne H. Knox, PhD (Rochester)
Professor of Optics and of Physics and Senior Scientist in the Laboratory for Laser Energetics

Peter Lennie, PhD (Cambridge)
Robert L. and Mary L. Sproull Dean of the Faculty of Arts, Sciences and Engineering and Professor of Brain and Cognitive Sciences, and in the Center for Visual Science

Scott M. MacRae, MD (Wisconsin)
Professor of Ophthalmology and in the Center for Visual Science

William R. Merigan, PhD (Maryland)
Professor of Ophthalmology, of Environmental Medicine, of Brain and Cognitive Sciences, and in the Center for Visual Science

Gary D. Paige, MD (Chicago)
Kilian J. and Caroline F. Schmitt Professor of Neurobiology and Anatomy, Professor of Biomedical Engineering, of Ophthalmology, of Brain and Cognitive Sciences, and in the Center for Visual Science

Tatiana Pasternak, PhD (Copenhagen)
Professor of Neurobiology and Anatomy, of Brain and Cognitive Sciences, and in the Center for Visual Science

Jannick Rolland, PhD (Arizona)
Brian J. Thompson Professor of Optical Engineering, Professor of Optics and of Biomedical Engineering

Marc H. Schieber, MD (Washington)
Professor of Neurology, of Neurobiology and Anatomy, of Physical Medicine and Rehabilitation, of Brain and Cognitive Sciences, and in the Center for Visual Science

Duje Tadin, PhD (Vanderbilt)
Professor of Brain and Cognitive Sciences and in the Center for Visual Science

David R. Williams, PhD (California, San Diego)
William G. Allyn Chair of Medical Optics, Professor of Optics, of Ophthalmology, of Biomedical Engineering, and of Brain and Cognitive Sciences; Director, Center for Visual Science
Minor in Visual Science

Requirements
Five courses are required.

- One of the following:
  CVS 110/BCS 110. Neural Foundations of Behavior
  CVS 111/BCS 111. Foundations of Cognitive Science
  CVS 153/BCS 153. Cognition
  BCS 240/NSC 201. Basic Neurobiology
  CVS 151/BCS 151. Perception and Action
  OPT 248/448/ BCS 223. Vision and the Eye

- One of the following upper-level courses:
  CVS 220/BCS 220. The Intelligent Eye
  CVS 245/BCS 245. Sensory and Motor Neuroscience
  CVS 391/BCS 391. Independent Study (one semester only)
  CVS 504/BCS 504. Sensory Systems (with permission of instructor)
  CVS 505/BCS 505. Perception and Motor Systems (with permission of instructor)

- CVS 391 or CVS 395. Independent Study/Independent Research in Visual Science

Research Minor in Visual Science

Requirements
Five courses are required.

- One of the following:
  CVS 110/BCS 110. Neural Foundations of Behavior
  CVS 111/BCS 111. Foundations of Cognitive Science

- CVS 151/BCS 151. Perception and Action

- OPT 248/448/ BCS 223. Vision and the Eye

- Two semesters of CVS 395. Independent Research in Visual Science. These may be either with the same faculty member in CVS or with two different faculty.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

110. Neural Foundations of Behavior.

Introduces the structure and organization of the brain, and its role in perception, movement, thinking, and other behavior. Topics include the brain as a special kind of computer, localization of function, effects of brain damage and disorders, differences between human and animal brains, sex differences, perception and control of movement, sleep, regulation of body states and emotions, and development and aging.
151. Perception and Action.
Explores how the biology of our senses shapes perceptual experiences of reality. Emphasizes sense of sight primarily and hearing secondarily. An important theme is that our sensory systems play a crucial role in the execution of coordinated movements of our bodies, as we navigate in, and interact with, the environment.

220. The Intelligent Eye.
Provides an interdisciplinary view of modern research into how the human brain solves the problems involved in perception, including how we perceive the three-dimensional structure of the world, how we recognize objects and how visual information is used to control action in the world. Students read contemporary research and, through classroom discussion and critical essays, explore and analyze the questions and debates that define contemporary perceptual science.

245. Sensory and Motor Neuroscience.
Focuses on how single neurons and populations of neurons represent sensory information, how sensory signals are transformed and decoded to mediate perception, and how perceptual signals are converted into neural commands to initiate actions. Explores how simple behaviors (such as detection and discrimination) can be quantified and explained in terms of neural activity. Introduces students to quantitative approaches for linking neural activity to perception and decision-making. Emphasizes studies of the visual, oculomotor, and somatosensory systems, with some attention to the auditory and vestibular systems as well.

391. Independent Study.


448. Principles of Eye Design.

Women’s Studies

Steering Committee

Professor
Honey Meconi, PhD (Harvard)
Susan B. Anthony Professor of Gender and Women’s Studies and Professor of Music, College Music Department and of Musikology, Eastman School of Music

Associate Professor
A. Joan Saab, PhD (NYU)
Associate Professor of Art History and of Visual and Cultural Studies
Grace Seiberling, PhD (Yale)
Associate Professor of Art History

Assistant Professor
Rachel Remmel, PhD (Chicago)
Assistant Professor of American Studies
Jeffrey T. Runner, PhD (Massachusetts, Amherst)
Associate Professor of Linguistics and of Brain and Cognitive Sciences
Stephanie Li, PhD (Cornell)
Assistant Professor of English

Women’s studies focuses on the experiences of diverse groups of women and the changing cultural, economic, political, and psychological relations among women and men. Because women’s studies asks questions about women and about gender that no single academic department is able to answer, the program encourages an interdisciplinary approach to research and learning.

The program offers an undergraduate major and minor, an honors program, clusters in the humanities and social sciences, and internships in the Rochester community. Students have the opportunity to work with faculty from the humanities, sciences, and social sciences, who are appointed in the College (School of Arts and Sciences), the Eastman School of Music, the Margaret Warner Graduate School of Education and Human Development, the School of Nursing, and the School of Medicine and Dentistry.

In the early 1980s the University opened the program in women’s studies to address issues important for understanding the role of women. The Susan B. Anthony Institute for Gender and Women’s Studies is named to honor Susan B. Anthony, the nineteenth-century suffragist who led a successful campaign to have women admitted to the University of Rochester in 1900. The Institute draws on Anthony’s goals and ideals and preserves her rich historical connection with the city of Rochester.

In addition to the undergraduate curricular program, other programs include undergraduate student conference, undergraduate student workshop with visiting scholars, graduate certificates, graduate fellowships, faculty research seminars, public lecture series, and conferences.

Women’s studies offers an interdisciplinary major, minor, or cluster that satisfies either the humanities or social sciences requirement, supervised by the program’s Curriculum Committee. The divisional identity of the WST major, minor, or cluster (social sciences or humanities) will be determined by the majority of the students’ foundation and elective courses.
**BA in Women’s Studies**

**Requirements**
- The humanities major in women’s studies requires 12 courses:
  - WST 200W—Colloquium (4 credits)
  - Three courses (12 credits) from among the foundation courses and electives (at least two in humanities)
  - Six electives in women’s studies (24 credits) from courses listed with at least two departments (at least 3 in humanities)
  - WST 394, Humanities Internship, or WST 395, Independent Research in Humanities (4 credits)
  - WST 396, Humanities Research Seminar (4 credits)
- The social sciences major in women’s studies requires 12 courses:
  - WST 200W—Colloquium (4 credits)
  - Three courses (12 credits) from among the foundation courses and electives (at least two in social sciences)
  - Six electives in women’s studies (24 credits) from courses listed with at least two departments (at least three in social sciences)
  - WST 394, Social Sciences Internship, or WST 395, Independent Research in Social Sciences (4 credits)
  - WST 396, Social Sciences Research Seminar (4 credits)

**Honors in Research**

Majors who are carrying a women's studies GPA of 3.3 or better and who have successfully completed at least one 300-level course (4 credits) in women's studies by the end of their junior year are eligible to work for honors in women's studies in their senior year. In the senior year, the honors sequence combines independent research (WST 393H) or an internship (WST 394H) in the fall with the production of an honors thesis (WST 397H) in the spring.

**Minor in Women’s Studies**

**Requirements**
- The humanities minor in women’s studies requires five courses:
  - WST 200W—Colloquium (4 credits)
  - Two WST foundation courses (8 credits) both in humanities
  - Two electives in women’s studies including at least one in humanities (8 credits) from courses listed with at least two departments (no more than two courses included in the students’ major may be counted toward the minor)
- The social sciences minor in women’s studies requires five courses:
  - WST 200W—Colloquium (4 credits)
  - Two WST foundation courses (8 credits) both in social sciences

Two electives in women’s studies including at least one in social sciences (8 credits) from courses listed with at least two departments (no more than two courses included in the students’ major may be counted toward the minor)

**Upper-Level Writing Requirement**

Majors in women’s studies are required to successfully complete two upper-level writing courses:
- WST 200W, Women's Studies Colloquium
- ONE of the following courses:
  - WST 391, Independent Study, provided that it requires substantial research, writing, and revision
  - WST 396, Women's Studies Seminar, as a writing course, by arrangement with the instructor

Majors who are minoring in another program or department may take an upper-level writing course in their minor.

*Note for double-majors:* the College requires that the upper-level writing requirement be satisfied separately for EACH major.

Please contact the SBAI Program Assistant at sbai@rochester.edu or (585) 275-8318 to schedule an appointment with an advisor.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**FOUNDATION COURSES**

**Women and Gender in History**

**201. Women in History: U.S. 1600–1970.**

Women in History surveys the historical experiences of American women from the era of colonization in the 17th century through the feminist movement of the 1970s. Topics for lecture and discussion include women’s work in and outside of the home, women in the family; women in social reform movements, education, and the professions; changing views of sexuality; and suffrage/feminist politics. Throughout the course we will also consider such themes/issues as differences of class, ethnicity, race, and religion among American women; the nature of sources for the study of women’s history; changing literary and visual “images” of American women; and how knowledge of women’s history affects traditional interpretations of American history.

**251. Women in East Asia.**

A history of women in the family, women and work, and women in society in three East Asian cultures.

This course will explore the history of African-American women from the 17th century to the present. African-American women developed a variety of responses to different economic, social, and political conditions in American society that depended on factors such as: the region they lived in, age, marital status, religious allegiances, class position, and political persuasions. Despite this diversity of experiences and identities African-American women continually contested the negative stereotypes presented in the dominant culture through political activism, social reform, and the sustaining of strong communities and families. In this class we shall explore the individual and collective actions of African-American women. We will focus on their personal stories, whether told through slave narrative, biographies, fiction or autobiography. By placing these individuals within their historical context we will gain a greater understanding of African-American women’s lives, and American history more generally.


What does it mean to be human? What political, economic, religious, social, or sexual rights might be part of different people’s working definitions? This course will look at both a) the historical development of conflicting theories of human rights and b) more contemporary debates about their ideal extent, their exercise, and their enforcement. Special topics will include debates over the meaning of the American and French Revolutions, the fight to design an International Declaration of Human Rights in the aftermath of World War II, the history of organizations such as Amnesty International, and the controversy around UN events such as the 1995 World Conference on Women in Beijing, the 2002 World Summit on Sustainable Development in Rio de Janeiro, and the 2000 and 2005 Millennium Summits in New York City.

Women and Gender in Society


Examines duality of women’s lives: how they are subordinated in patriarchal systems cross-culturally and how they use indirect aggression to obtain power. Class participants consider race and class variation and the gender specific ways women respond to systemic subordination. Ethnography and ethnographic techniques enable students to interview at least three generations of women regarding their life histories.


What is the impact of a new global economy on families, marriage and communities around the world and in the United States? Are there new forms of transnational social relations, marriage, love, families?

Women and Gender in Politics

203F. Women in Politics.

Explores women’s evolving roles in American politics. Topics include: a brief historical review of women’s rights; women’s roles in social movements; and women in electoral politics and as elected officials.

Women and Gender in Art

214. Women as Image and Text.

Feminist art historians have changed the way we think about images of women, works by women artists, and the very notion of artistic genius. This course will investigate the way in which visual images of women participate with other cultural and social factors in the construction of the idea of woman. It will look at types and conventions in works by male and female artists, as well as in anonymous prints and advertising from different periods, with a concentration on the 19th and 20th centuries. Readings will introduce a variety of approaches.

Philosophical Foundations of Feminism

205F. Philosophical Foundations of Feminism.

Contemporary feminist theory: the conception of women expressed through our practices, laws, theories and literature; equality and equal rights; sex roles and gender specific language; power relations and self-determination; marriage and maternity.

Feminism, Gender, and Health

206. Feminism, Gender, and Health.

How theories of gender, social organization, and biological sex shape the areas of health care. Examine gender, social class, and race in mediating health effects, with emphasis on women’s health. Examine the life cycle, transitions, trauma, access to services, HIV/AIDS, reproductive health and longevity.

Women Writers

240. Writing Women’s Lives.

In this course we shall examine women’s lives through the act of non-fiction writing. Focusing on prose writing (rather than poetry), each student will actively practice the creative act of telling the truth about her own and other women’s lives. We shall also read many diverse examples of women’s autobiographical writing and other non-fiction genres, by such acclaimed practitioners as Virginia Woolf, bell hooks, Alice Walker, Annie Dillard, Dorothy Allison, and Maxine Hong Kingston.
243. Major Author: Toni Morrison.
Intensive study of the writings of a single author or small group of authors from British or American literary traditions.

256. Latin American Women Writers.
Through study of texts (mostly novels) written by women from Latin America, broad questions concerning cultural contexts with respect to sexuality and gender, language, aesthetics, psychology, and social issues are addressed. The course uses materials from a variety of fields (literary and cultural theory, film studies, psychology, history, sociology, anthropology, feminist studies) in addition to the primary texts. All texts and discussions in English. Emphasis on collaborative research and progressive writing assignments.

A critical and historical introduction to Japanese women writers: the socio-historical, cultural, and ideological context for and emergence of a literary tradition.

Varying topics relating to the literature and culture of the Americas.

Feminism and Gender Studies in Film

204. Feminist Film Theory.
Feminism has had a powerful impact on the developing field of film theory from the 1970s to the present. This course will examine the major feminist work on film, moving from the earlier text-based psychoanalytic theories of representation to theories of feminine spectatorship to studies of reception contexts and audience. We will also give some attention to the very important role of feminist theory in television studies. Weekly screenings, keyed to the readings, will allow us to test the value of these positions for close critical analysis of the film or television text. Readings to include: Laura Mulvey, Kaja Silverman, Constance Penley, Judith Mayne, Linda Williams, Jacqueline Bobo, Valerie Smith, Lynn Spigel, Lynne Joyrich, Julie D’Acci.

264. Women in Hispanic Film.
Examine images of women in a variety of films from Latin America and Spain. Topics range from the use of “the feminine” in war propaganda, to films of the Franco dictatorship, and from Latin American political documentaries to popular commercial films. Emphasis on cinematic representation as visual ideology, and on films at the millennium. Class taught in English. Written work in Spanish for SP credit.

288. Mothers, Comrades, and Whores.
It is common now to hear that we live in a transnational age, but what does this really mean? How do we imagine our transnational community? In this course we will examine contemporary transformations from national to trans-national culture by focusing precisely on film production. This course will examine how film provides one of the central sources of transnational images. Germany will provide us with a case study and we will view a wide variety of German and European, national and transnational films. Through this case study we will address larger questions of globalization. Through hot new cult films like “Run, Lola Run,” or big budget epics like “House of the Spirits,” we will examine the aesthetic and technical transformations that have given rise to these new ways of imagining our community. PLEASE NOTE: Attendance at weekly film screening is mandatory—alternative time will be set up.

Gender and Sexuality

103. Language and Sexuality.
This course will investigate various aspects of language as used by members of sexual minority groups, focusing on language of and about gay men, lesbians, bisexuals and transgendered people, including “reclaimed epithets” (e.g., ‘dyke’ and ‘queer’), gender vs. sexuality vs. sex, and the role of language in creating/maintaining sexual categories and identities.

221. Representing Differences.
The question of difference will be approached in this seminar through the narrow lens of what has come to be called “queer theory.” We will read a select number of foundational texts, including Foucault’s History of Sexuality and Freud’s Three Essays, which will lay the groundwork for analysis of recent theorists working within the domains of psychoanalysis and new historicism. A central question for the seminar will be: How do these theories function politically? How do they work with and/or against a politics of rights? Students will lead seminar discussions on theoretical texts of their choosing.

272. Gender and Sexuality.
This course will examine literary, artistic, and theoretical representations of gender and sexuality as they have changed in the course of the 20th century. The focus will be on texts from Western Europe and the US, but we will also consider other perspectives. From the New Women to French Feminists and transnational feminism, from homophile societies to ”queer nation and gay marriage, from Sigmund Freud to Michel Foucault and Judith Butler, we will explore the contested and politically charged debates around gender and sexuality that have shaped our views of identity over the last century.

ELECTIVE COURSES

391. Independent Study.
Students interested in Independent Studies should contact the women’s studies program.

393. Senior Project.
Independent research with substantial supervised research and written work in gender and women’s studies. This research should be directed toward work in WST 397.
393H. Honors—Independent Research.
Independent research with substantial supervised research and written work in gender and women’s studies. This research should be directed toward work in WST 397.

394. Internship.
It is the student’s responsibility to arrange the internship with the organization and to find a professor as an advisor for the internship. Organization/Companies currently offering internships are Afterimage, Alternatives for Battered Women, Center for Dispute Settlement, City Council of Rochester, Division of Human Rights, Gay Alliance of Genesee Valley, Monroe Districts Attorney’s Office, Planned Parenthood, St. Joseph’s Villa, Sojourner House, Susan B. Anthony House, TV Dinner/Metro Justice, Urban League of Rochester, Visual Studies Workshop, Wheatley Library Branch and the YWCA. Position descriptions are available in Lattimore 538.

394H. Internship—Honors.

395. Independent Research.
Independent research with substantial supervised research and written work in gender and women’s studies.

396. Seminar in Women’s Studies.
Juniors and seniors only or prerequisite course in African-American Literature, American Literature, or Women’s Studies. Interested students should contact the women’s studies program.

Open only to senior majors or by permission of instructor. Honors in Research recognizes the completion of a distinguished thesis, research paper of approximately 35 pages researched and written under the direction of the faculty advisor, and approved by the faculty advisor and second reader. It is expected that this thesis will be based on research undertaken through WST 393H and WST 394H, and completed in WST 397.
Arts, Sciences, and Engineering

Edmund A. Hajim School of Engineering and Applied Sciences

Administrative Officers

Peter Lennie, PhD (Rochester)
  Robert L. and Mary L. Sproull Dean of the Faculty of Arts, Sciences and Engineering
Richard Feldman, PhD (Massachusetts)
  Dean of the College
Robert L. Clark, PhD (Virginia Polytechnic Institute and State University)
  Dean of the Edmund A. Hajim School of Engineering and Applied Sciences
Thomas Y. Hsiang, PhD (California, Berkeley)
  Associate Dean of the Edmund A. Hajim School of Engineering and Applied Sciences

About

The College encompasses the disciplines of the School of Arts and Sciences, as well as the departments within the Edmund A. Hajim School of Engineering and Applied Sciences, that together enroll the majority of University undergraduates and graduate students.

The Hajim School of Engineering and Applied Sciences offers degree programs leading to the BA, BS, MS, and PhD 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 programs have two main objectives:

1. to prepare students for positions as practicing engineers, scientists, 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 and science, giving them an understanding of science and technology that will provide a firm foundation for their lifework.

Each program has adopted more specific goals and objectives that are given in the appropriate discipline sections of this bulletin.

The emphasis is on both individual opportunity and collaborative team effort. Students are encouraged to participate in the many active research projects both in the school and through cooperative internships in business and industry. Flexibility in each program makes it possible to incorporate specialized coursework. For instance, engineering students can pursue elective work and undertake research projects in such fields as architecture, environmental studies, and materials science.

In their first year, enrolled students who have expressed interest in engineering or applied sciences majors are assigned Hajim School faculty advisors who counsel interested students on the school’s degree requirements, policies, and procedures. Students formally enter the school at the end of their sophomore year or at any time in their undergraduate tenure that they have satisfied the necessary prerequisites.

Four-year courses of study lead to the BA degree in computer science and engineering science and the BS degree in biomedical engineering, computer science, chemical engineering, electrical and computer engineering, geomechanics, mechanical engineering, optics, optical engineering, or an interdepartmental program in engineering and applied science. The BS degree programs in chemical, biomedical, electrical and computer, 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.

BA in Engineering Science

Requirements

One option for students, especially those who are uncertain about their intended specialization or are interested in a broad introduction to several fields of engineering, is the BA in 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 majors. The other requirements 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 engineering BS students.

**BS Degree**

Requirements

In addition to the specific courses stipulated in the degree programs, students must satisfactorily complete the following:

1. **Semester hour requirements:** The Department of Biomedical Engineering requires a minimum of 150 semester hours; the Department of Chemical Engineering, 132; the Department of Computer Science, 118; the Department of Electrical and Computer Engineering, 128; the Department of Mechanical Engineering, 129; and The Institute of Optics, 130.

2. **Writing requirement:** Entering students are advised by the College Writing Center in the selection of an appropriate primary writing course. Students should complete this requirement by the end of their first year. The ability to communicate clearly and effectively is extremely important. Each department and program has incorporated a discipline-specific upper-level writing experience into the curriculum, as described in the bulletin sections of each program. Every student must complete the upper-level writing requirements of their degree program.

3. **Cluster requirements:** Clusters in the areas of humanities and social sciences are an important and integral part of an engineering education, and should be carefully chosen with the help of faculty advisors. Students in Bachelor of Science degree programs in biomedical, chemical, electrical and computer, mechanical, or optical engineering, or optics are required to complete one cluster in either the humanities or social sciences and an additional one or two humanities or social sciences courses for distribution requirements. Students completing the Bachelor of Science degree programs in computer science, geomechanics, or the interdepartmental program, or the Bachelor of Arts in computer science or engineering science are required to complete two clusters, one each in the humanities and social sciences. Another way of fulfilling cluster and 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). Refer to individual department or program sections in this bulletin for further details.

4. **Distribution requirements:** Engineering students must take four to six humanities and/or social sciences courses depending on their department’s policy. For ABET- accredited degree programs, three of these courses must constitute an approved humanities/social sciences cluster (regardless of the classification of the individual courses that make up the cluster). The remaining one or two courses must be classified by the College as humanities and/or social sciences courses.

5. **Residency requirement:** The intent of the residency requirement is to ensure that graduates have taken a substantial number of the advanced courses required for their major in a timely fashion at the University of Rochester. To qualify for an undergraduate degree, a student must complete at least four semesters of full-time study, or for part-time students, the equivalent number of credit hours.

6. **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 the major.

7. All students accepted into the Hajim School of Engineering and Applied Sciences become responsible for two full years of equipment fees. These are normally assessed during each semester of the junior and senior years.

Flexible First Year

Students intending to pursue an engineering or applied science program are accepted into the College in their first year and are assigned an advisor from the Hajim School faculty. Students choose their engineering and sciences electives in consultation with their faculty advisor. First-year students who have chosen a major field should take the courses recommended for that major 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 first year because appropriate engineering courses taken in the first 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 Hajim School of Engineering and Applied Sciences at the University of Rochester at any time, but will find it necessary to satisfy those prerequisites they may be lacking.

Minors

The Hajim School of Engineering and Applied Sciences recognizes all minors offered by the College. In addition, the Hajim School of Engineering and Applied Sciences offers minors in bioenvironmental engineering, biomedical engineering, chemical engineering, computer science, electrical and computer engineering, environmental engineering, materials science, mechanical engineering, and optics. These minors are available to all undergraduates as a way to strengthen their academic program.

Braude College Exchange Program

The College is pleased to offer a unique and innovative English-language study abroad program at Braude College in Karmiel, Israel, designed especially for University of Rochester students of science and engineering. The program specifically meets the needs of sophomores considering majoring in mechanical, chemical, electrical and computer, and biomedical engineering, and chemistry, physics, and computer science. Some juniors (for example, Take Five students) may be eligible.

While on the program, students live in the Braude residence halls. An inexpensive cafeteria, sports facilities, extracurricular
activities, and many social functions are available on campus. All Rochester students have a local student mentor. Students have the opportunity to learn Hebrew on the program and to take Introduction to the History and Archaeology of the Galilee as well. Students may also choose to stay in Israel for the summer on the 8-credit summer archaeological dig in the Galilee, a University of Rochester summer study abroad program.

This is a spring-only program. Approximate dates are March 1 through July 5, with a one-week break during the Israeli Passover vacation. All courses are taught in English. The application deadline is October 15. Additional information is available at the Center for Study Abroad and Interdepartmental Programs, 206 Lattimore Hall, and on the web at www.hajim.rochester.edu/options/OR-T-Braude.html.

Industry Practicum Co-Op Program

When looking for employment, students have discovered that employers increasingly demand significant practical work experience in addition to sound academic knowledge. The optional Industry Practicum Co-Op Program provides an opportunity for students to enhance their education by integrating their engineering and computer science knowledge with workplace practice. Students intending to pursue an engineering or computer science degree are encouraged to participate in the school’s Industry Practicum Co-Op Program, a paid, full-time, high-quality work experience over an eight-month period.

To participate, students must be second-semester juniors or a first-semester seniors and be pursuing a degree in any engineering discipline, optics, or computer science. During the eight-month Industry Practicum Co-Op Program, students do not take any classes, receive any academic credit, or pay tuition. As a result, it is important for students to meet with their faculty advisors to plan their potential participation in the Industry Practicum Co-Op Program to ensure that they meet departmental requirements. Advisors assist students in curriculum planning since four-and-a-half-year’s time will be necessary to complete the usual four-year academic program.

Additional information on this program can be obtained from the school’s Deans Office, 301 Lattimore Hall, or from the Gwen M. Greene Career and Internship Center, Meliora Hall.

Double Degrees

Students may earn both a degree in the Hajim School of Engineering and Applied Sciences and a BA or BS degree in a chosen liberal arts or science major. These students essentially complete a program similar to a two-college program, but do so entirely at the University of Rochester. Dual degrees require significant work beyond the normal requirements of a four-year program, and all degree requirements for both programs must be satisfied. Any extension past the normal four-year time span will not be tuition free. Students may earn two bachelor’s degrees from the Hajim School of Engineering and Applied Sciences; however, the interdepartmental BS program may not be one of the two degrees unless approved by the Administrative Committee.

BS-MS Programs

Combined BS-MS programs in biomedical engineering, chemical engineering, computer science, electrical engineering, materials science, mechanical engineering, and optics are available to those students wanting to blend their undergraduate program with graduate study. Students who wish to complete a bachelor’s degree in engineering and an MBA may be able to combine an undergraduate engineering program with work in the William E. Simon Graduate School of Business Administration. Because engineering program requirements exceed those of other undergraduate majors, the majority of engineering undergraduates will not be ready to take advantage of the application schedule followed by most University undergraduates from other disciplines. Therefore, the Simon School offers two additional options to accelerate the completion of both undergraduate and graduate degrees to eligible engineering students. (Engineering science majors are encouraged to arrange their programs to participate in the normal 3-2 program.)

Option 1 requires students to apply by November 15 of their senior year for admission to the MBA program beginning in January. This option offers the student the full benefits of MBA study insofar as the core courses are taken in sequence and the study-team approach is fully realized. Option 1 also offers the opportunity for students to take a summer internship, provided the student is willing to add the three courses normally taken during the summer quarter (one each) to the remaining three academic quarters of the second year of MBA coursework.

Option 2 is designed for engineering students who will not complete required engineering courses by the end of the fall semester of their senior year. Students commence MBA coursework on a part-time basis during the fall semester of their senior year. Although option 2 permits the completion of both the bachelor’s and master’s degrees in five years, it usually does not involve a summer internship nor does it offer the strong team experience and class bonding opportunities of option 1.

Both of these options 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.

Transferring into the Hajim School

Students with engineering or applied sciences interests may transfer into the Hajim School of Engineering and Applied Sciences 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 school 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 BA degree at the same time a BS in engineering is awarded at Rochester. Transfer programs formalized in this way are “3-2” programs. There are 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 school on an individual basis. Course equivalency and credit are determined for each case.

Academic Support Services

Edmund A. Hajim School of Engineering and Applied Sciences

The Dean’s Office in 301 Lattimore 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, view the Academic Services and Information section of this bulletin.

The Hajim School of Engineering and Applied Sciences assigns faculty advisors to each known prospective engineering and applied sciences student in the first year to provide information about different engineering and applied sciences 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 school 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.

Biomedical Engineering

Professor

Laurel H. Carney, PhD (Wisconsin)
Professor of Biomedical Engineering and of Neurobiology and Anatomy

Richard E. Waugh, PhD (Duke)
Professor of Biomedical Engineering, of Pharmacology and Physiology, of Biochemistry and Biophysics, and of Mechanical Engineering

Associate Professor

Hani Awad, PhD (University of Cincinnati)
Associate Professor of Biomedical Engineering and of Orthopaedics

Edward Brown III, PhD (Cornell)
Associate Professor of Biomedical Engineering

Diane Dalecki, PhD (Rochester)
Associate Professor of Biomedical Engineering and of Electrical and Computer Engineering; Director, Rochester Center for Biomedical Ultrasound

Kevin Davis, PhD (Boston)
Associate Professor of Biomedical Engineering and of Neurobiology and Anatomy

Amy L. Lerner, PhD (Michigan)
Associate Professor of Biomedical Engineering, of Mechanical Engineering, and in the Center for Musculoskeletal Research

Anne E. Luebke, PhD (Johns Hopkins)
Associate Professor of Biomedical Engineering and of Neurobiology and Anatomy

James McGrath, PhD (MIT)
Associate Professor of Biomedical Engineering

Axel Wismüller, MD, PhD (Technische Universität München, Germany)
Assistant Professor of Biomedical Engineering

Assistant Professor

Danielle Benoit, PhD (Colorado)
Assistant Professor of Biomedical Engineering, of Chemical Engineering, and in the Center for Musculoskeletal Research

Regine Choe, PhD (Pennsylvania)
Assistant Professor of Biomedical Engineering

Mathews Jacobs, PhD (Swiss Federal Institute of Technology, Switzerland)
Assistant Professor of Biomedical Engineering, of Electrical and Computer Engineering, and of Imaging Sciences

Stephen McAleavey, PhD (Rochester)
Assistant Professor of Biomedical Engineering and of Electrical and Computer Engineering

Jong Hoon Nam, PhD (Virginia Tech)
Assistant Professor of Mechanical Engineering and of Biomedical Engineering

Scott Seidman, PhD (Case Western Reserve)
Assistant Professor of Biomedical Engineering, of Neurobiology and Anatomy, and in the Center for Visual Science

Joint Appointments with Biomedical Engineering

Professor

Robert Clark, PhD (Virginia Polytechnic Inst.)
Professor of Mechanical Engineering and of Biomedical Engineering; Dean, School of Engineering and Applied Sciences
Jianhui Zhong, PhD (Brown)
  Professor of Imaging Sciences, of Biomedical Engineering, and of Physics

Andrew Berger, PhD (MIT)
  Associate Professor of Optics and of Biomedical Engineering

Patricia Chess, MD (Columbia)
  Associate Professor of Pediatrics and of Biomedical Engineering

Edward G. Freedman, PhD (Pennsylvania)
  Associate Professor of Neurobiology and Anatomy, of Biomedical Engineering, and in the Center for Visual Science

Denise Hocking, PhD (Albany)
  Associate Professor of Pharmacology and Physiology and of Biomedical Engineering

Ben Miller, PhD (Stafford)
  Associate Professor of Dermatology, of Biochemistry and Biophysics, and of Biomedical Engineering

Jack G. Mottley, PhD (Washington, St. Louis)
  Associate Professor of Electrical and Computer Engineering and of Biomedical Engineering

Edward M. Schwarz, PhD (Albert Einstein College of Medicine)
  Associate Professor of Orthopaedics, of Microbiology and Immunology, of Urology, of Medicine, of Pathology and Laboratory Medicine, and of Biomedical Engineering

James M. Zavislan, PhD (Rochester)
  Associate Professor of Optics, of Dermatology, of Ophthalmology, and of Biomedical Engineering

Gary Paige, MD (Chicago)
  Kilian J. and Caroline F. Schmitt Professor of Neurobiology and Anatomy, Professor of Neurology, of Ophthalmology, of Brain and Cognitive Sciences, of Biomedical Engineering, and in the Center for Visual Science; Chair of Neurobiology and Anatomy

Kevin J. Parker, PhD (MIT)
  William F. May Professor of Engineering, Professor of Electrical and Computer Engineering, of Imaging Sciences, and of Biomedical Engineering

Renato Perucchio, D. Engr. (Pisa, Italy)
  Professor of Mechanical Engineering and of Biomedical Engineering and Associate Professor of Pediatrics

J. Edward Puzas, PhD (Rochester)
  Donald and Mary Clark Professor of Orthopaedics and Professor of Biomedical Engineering

Jannick Rolland, PhD (University of Arizona)
  Professor of Optics and of Biomedical Engineering

Deborah Rubens, MD (Rochester)
  Professor of Imaging Sciences; Associate Chair of Imaging Sciences

Ingrid H. Sarelius, PhD (Auckland, New Zealand)
  Professor of Pharmacology and Physiology and of Biomedical Engineering

Michael C. Schell, PhD (Wisconsin, Madison)
  Professor of Radiation Oncology and of Biomedical Engineering

Denham S. Ward, MD (Miami)
  Professor of Anesthesiology and of Biomedical Engineering

David R. Williams, PhD (California, San Diego)
  William G. Allyn Professor of Medical Optics, Professor of Brain and Cognitive Sciences, of Psychology, of Optics, of Ophthalmology, of Biomedical Engineering, and in the Center for Visual Science; Director of the Center for Visual Science

J. H. David Wu, PhD (MIT)
  Professor of Chemical Engineering, of Microbiology and Immunology, and of Biomedical Engineering

Associate Professor

Andrew Berger, PhD (MIT)
  Associate Professor of Optics and of Biomedical Engineering

Patricia Chess, MD (Columbia)
  Associate Professor of Pediatrics and of Biomedical Engineering

Edward G. Freedman, PhD (Pennsylvania)
  Associate Professor of Neurobiology and Anatomy, of Biomedical Engineering, and in the Center for Visual Science

Denise Hocking, PhD (Albany)
  Associate Professor of Pharmacology and Physiology and of Biomedical Engineering

Ben Miller, PhD (Stafford)
  Associate Professor of Dermatology, of Biochemistry and Biophysics, and of Biomedical Engineering

Jack G. Mottley, PhD (Washington, St. Louis)
  Associate Professor of Electrical and Computer Engineering and of Biomedical Engineering

Edward M. Schwarz, PhD (Albert Einstein College of Medicine)
  Associate Professor of Orthopaedics, of Microbiology and Immunology, of Urology, of Medicine, of Pathology and Laboratory Medicine, and of Biomedical Engineering

James M. Zavislan, PhD (Rochester)
  Associate Professor of Optics, of Dermatology, of Ophthalmology, and of Biomedical Engineering

Assistant Professor

David Borkholder, PhD (Stanford)
  Assistant Professor of Electrical Engineering, Rochester Institute of Technology, and Adjunct Associate Professor of Biomedical Engineering

Ankur Chandra, MD (Case Western Reserve)
  Assistant Professor of Surgery and of Biomedical Engineering

Benjamin Crane, MD, PhD (California, Los Angeles)
  Assistant Professor of Neurobiology and Anatomy and of Biomedical Engineering

Lisa A. DeLouise, PhD (Pennsylvania State)
  Assistant Professor of Dermatology and of Biomedical Engineering

Marvin Doley, PhD (University of London)
  Assistant Professor of Electrical and Computer Engineering and of Biomedical Engineering

Alfredo Dubra, PhD (Imperial College, UK)
  Assistant Professor of Ophthalmology and of Biomedical Engineering

Jeffery Houck, PhD (University of Iowa)
  Adjunct Assistant Professor of Biomedical Engineering

Luiz Meirelles, PhD (University of Gothenburg)
  Assistant Professor of Dentistry and of Biomedical Engineering

Geunyoung Yoon, PhD (Osaka)
  Assistant Professor of Ophthalmology, of Biomedical Engineering, and in the Center for Visual Science

Professor Emeritus

Alfred Clark, Jr., PhD (MIT)
  Professor Emeritus of Mechanical Engineering, of Mathematics, and of Biomedical Engineering
Affiliated Faculty

Professor

Edwin Carstensen, PhD (Pennsylvania)
Arthur Gould Yates Professor Emeritus of Engineering and Senior Scientist in Electrical and Computer Engineering

Arthur Moss, MD (Harvard)
Professor of Medicine

Alice Pentland, MD (Michigan)
James H. Sterner Professor of Dermatology; Medical Director of Center for Future Health and Chair of Dermatology

Shey-Shing Sheu, PhD (Chicago)
Professor of Pharmacology and Physiology, of Medicine, and of Anesthesiology

Peter G. Shrager, PhD (California, Berkeley)
Professor of Neurobiology and Anatomy

Associate Professor

Paul E. Bigeleisen, MD (California, Davis)
Associate Professor of Anesthesiology

Karl Schwarz, MD (Rochester)
Associate Professor of Medicine and of Biomedical Engineering

Assistant Professor

Jean-Philippe Couderc, PhD (National Institute of Applied Science, Lyon, France)
Research Assistant Professor of Medicine

Biomedical engineering (BME) involves the application of engineering science and technology to solve problems in biology and medicine. This broad area contains many career opportunities, ranging in scope from advanced research to engineering practice in a clinical setting. The Department of Biomedical Engineering, in conjunction with strong academic programs in the basic sciences and other engineering disciplines at the University of Rochester, offers outstanding training in this rapidly growing field.

Departmental Mission and Objectives

Mission

Our mission is to create and disseminate knowledge in engineering related to biomedical sciences and health care applications and to provide students with the foundational knowledge and skills that they will need to become and remain leaders in their chosen field.

Undergraduate Program Objective

The overall educational objective of our program is to develop effective practitioners in biomedical engineering and associated fields. We expect that our graduates will contribute to advancement of their chosen field, while remaining mindful of the ethical and social implications of their work. They will confidently apply knowledge in the basic sciences, mathematics, engineering analysis, and design to address problems in medicine and biology. In keeping with the continuously evolving nature of the field of biomedical engineering, we expect that our alumni will effectively communicate, engage in lifelong learning, and that many of them, inspired by research experiences as undergraduates, will continue their education in advanced degree programs.

Admission Requirements

To be considered for admission to the biomedical engineering major, students must have taken courses in the first two years to enable a program of study that satisfies the requirements of the program and that can be completed in a total of four years.

The minimum requirements for admission to the BME program are

- satisfactory completion of BME 101 (by the end of the sophomore year)
- two engineering courses (usually BME 210, BME 201/201P)
- a minimum GPA of 2.30 in these three courses

satisfactory completion of the basic science and math requirements

- a minimum overall cumulative GPA of 2.0
- satisfactory completion of the University primary writing requirement

BS in Biomedical Engineering

The Bachelor of Science degree program in biomedical engineering at the University of Rochester is one of 71 programs (as of October 2010) that is accredited by the Accreditation Board for Engineering and Technology (ABET). The curriculum emphasizes fundamental engineering and design principles taught in the context of current problems in medicine and biology. A series of nine core courses required of all BME students provides a solid foundation in engineering principles relevant to biomedical engineering practice. To ensure in-depth training in engineering, students are required to complete a sequence of four engineering courses in a focus area of biomedical engineering. These areas of concentration are Biomechanics, Biosignals and Biosystems, Cell and Tissue Engineering, and Medical Optics. The program is capped with a biomedical engineering senior design course required for all students. This program requires a total of 32.5 courses (130 credit hours), including a minimum of 51 credit hours devoted to mathematics and natural sciences and a minimum of 51 credit hours devoted to engineering.

The faculty of the Department of Biomedical Engineering recognizes achievement among our graduates by noting those who graduate with distinction based upon their average grades in their core BME courses. In particular, students who have a GPA of 3.75 or higher in the core BME courses will receive their degrees with Highest Distinction; those with GPAs between 3.50 and 3.74 will be noted to have achieved High Distinction; and those who have GPAs between 3.25 and 3.49 will receive Distinction.

Alternative recognition for meaningful biomedical engineering-related coursework and research is available through the minor in BME. The minor is available to students in any major.

More information about the minor or the major in biomedical engineering can be obtained at the BME Undergraduate Office on the second floor of Goergen Hall or on our website at www.bme.rochester.edu.
Standard Four-Year Program

Graduation requirements for BME: minimum of 130 credits.

Students majoring in biomedical engineering complete common freshman and sophomore years:

**Freshman Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
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<tbody>
<tr>
<td>MTH 161*</td>
<td>MTH 162*</td>
</tr>
<tr>
<td>CHM 131</td>
<td>CHM 132</td>
</tr>
<tr>
<td>BME 101</td>
<td>PHY 121</td>
</tr>
<tr>
<td>WRT 105 (Primary Writing)</td>
<td>Humanities or Social Sciences</td>
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**Sophomore Year**

<table>
<thead>
<tr>
<th>Fall</th>
<th>Spring</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTH 163 or 165*</td>
<td>MTH 164*</td>
</tr>
<tr>
<td>BIO 110</td>
<td>Basic science elective or concentration course†</td>
</tr>
<tr>
<td>PHY 122</td>
<td>BME 210</td>
</tr>
<tr>
<td>BME 201 &amp; 201P</td>
<td>Humanities or Social Sciences</td>
</tr>
</tbody>
</table>

**Biomedical Engineering Core Courses**

Nine core courses are required for all students majoring in biomedical engineering:

- BME 101 or EAS 101.
- Introduction to Biomedical Engineering
- BME 201/201P. Fundamentals of Biomechanics
- MATLAB for Bioengineers (1 credit)
- BME 210. Biosystems and Circuits
- BME 221. Biomedical Computation
- BME 230. Biomedical Signals and Measurements
- BME 245. Biomaterials
- BME 260. Quantitative Physiology
- BME 295. BME Design Seminar (2 credits)
- BME 296. BME Senior Design

**Biomedical Engineering Concentration Areas**

Students choose to concentrate in one of four specialty areas. Four engineering courses forming a sequence in either Biosignals and Biosystems, Biomechanics, Cell and Tissue Engineering, or Medical Optics are required. Each concentration includes an upper-level BME course in the specialty area.

**Biosignals and Biosystems**

- ECE 241. Signals
- ECE 221. Electronic Devices and Circuits

**Biomechanics**

- ME 226. Solids
- ME 225. Fluid Mechanics
- ME 123. Thermodynamics
- Upper-level BME: e.g., BME 218, Neural Engineering; BME 251/451, Biomedical Ultrasound; BME 452, Medical Imaging

**Cell and Tissue Engineering**

- CHE 243. Fluid Dynamics
- CHE 244. Heat & Mass Transfer
- CHE 225. Thermodynamics
- Upper-level BME: e.g., BME 262/462, Cell and Tissue Engineering

**Medical Optics**

- OPT 241. Geometrical Optics
- OPT 261. Interference & Diffraction
- OPT 262. Electromagnetic Theory
- OPT 224. Laser Systems
- PHY 123. Waves and Modern Physics
- Upper-Level BME: e.g., OPT 276, Biomedical Optics; or BME 270, Biomedical Microscopy

In addition to concentration-area courses, students are required to complete the following basic science, math, and distribution requirements as well as electives complementing the BME courses.

**Primary Writing Requirement**

Students are required to fulfill the University primary writing requirement. Typically, the course WRT 105 is used for this requirement.

**Basic Sciences and Mathematics**

- Four math courses: MTH 161, 162, 163/165, 164
- Two chemistry courses: CHM 131, 132
- Two physics courses: PHY 121, 122
- One biology course: BIO 110

**Basic Science Electives (12 credit hours)**

All students must complete at least three additional courses (at least 12 credit hours) in the basic sciences beyond the required introductory biology (BIO 110), chemistry (CHM 131 and 132), and physics (PHY 121/121 and 122/142) courses. Any biology, microbiology, neuroscience, chemistry, or physics course with a number greater than 109 may be used to fulfill this requirement (excluding BIO 111, 112, 113).
At least two of these courses must have a laboratory component. At least two courses must be life science courses (i.e., biology, microbiology, neuroscience). Students are encouraged to choose their basic science electives to complement their BME concentration area. Independent study courses cannot be used to satisfy this requirement. Contact department for further details.

Humanities and Social Sciences
Students must take four courses in the humanities and/or social sciences. Three of these courses must complete an approved cluster.

Minor in Biomedical Engineering
The biomedical engineering minor provides substantive exposure to the biological and engineering sciences and gives students a basic perspective on the complex structure and function of living systems and their analysis by physical and engineering principles. The minor is available to students in all majors, but engineering and biology students find it easier to complete these requirements. Students may not use more than two of the courses required for the BME minor to also satisfy requirements in their major (including technical electives). All students that propose a minor in BME must fulfill the basic math requirements (MTH 163/165).

Biological Science Courses (8 credit hours)
Students must complete two life science courses (i.e., biology, microbiology, or neuroscience above 110).

Engineering Courses (12 credit hours)
Choose three courses, two of which must be BME courses including any 400-level BME courses or cross-listed courses.

Note: Students are warned to confirm that all prerequisites for the courses below are fulfilled.
- BME 201/201P. Fundamentals of Biomechanics/MAT-LAB for Bioengineers (1 credit)
- BME 210. Biocircuits and Circuits
- BME 218. Introduction to Neuroengineering
- BME 221. Biomedical Computation
- BME 228. Physiological Control Systems
- BME 230. Biomedical Signals and Measurements
- BME 245. Biomaterials
- BME 251. Biomedical Ultrasound
- BME 260. Quantitative Physiology
- BME 262. Cell and Tissue Engineering
- BME 267. Models and Simulations of Biomedical Systems
- BME 270. Biomedical Microscopy
- BME 283. Biosolid Mechanics
- BME 391. Independent Study
- CHE 243 or ME 225. Fluid Dynamics/Introduction to Fluid Dynamics
- CHE 259. Transport Phenomena in Biological Systems
- ECE 210 or 113. Circuits for Scientists and Engineers/Circuits and Signals
- ME 226. Introduction to Solid Mechanics
- OPT 224. Laser Systems
- OPT 241. Geometrical Optics

Upper-Level Writing Requirement
The upper-level writing requirement is satisfied through BME 221, 230, 260, 296, and the upper-level BME courses.

BS-MS Program
Early admission to the master’s degree program is possible for exceptionally well-qualified undergraduate majors at the University of Rochester. Students must apply by April 1 of their junior year for admission to the program. The standard application for graduate study should be used. In addition, a proposed program of study and an essay describing the goals and rationale for advanced study should be provided as part of the application. Partial tuition scholarships are available on a competitive basis for the fifth year of study only.

Admission to the 3-2 program provides students with some flexibility in scheduling courses in the senior and fifth years of study. With the appropriate approvals, up to two fall courses required for the undergraduate degree may be deferred until the fall of the fifth year. The University requires that all requirements for the bachelor’s degree must be completed before the start of the spring semester of the fifth year of study. Courses taken during the first four years of study that are not needed to fulfill the requirements for the bachelor’s degree may be applied toward the master’s degree program of study with the approval of the BME Graduate Committee. All students in this program are expected to serve as teaching assistants for one semester.

University of Rochester graduates who are not admitted to the 3-2 program may apply during their senior year for admission to the master’s program. All applicants are considered for available tuition scholarships in any given year. Teaching experience as a teaching assistant for at least one semester is required.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

101. Introduction to Biomedical Engineering.
An introductory overview of the multidisciplinary field of biomedical engineering. Application of elementary engineering principles to the analyses of physiological systems. Course topics include biomechanics, cell and tissue engineering, biosignals, biosystems, bioinstrumentation, medical imaging, medical optics, and bioethics. Includes weekly laboratory and introduction to the use of computers as tools for solving engineering problems.

201. Fundamentals of Biomechanics.
Teaches elementary mechanical equilibrium and motion with extended applications to biology. Lectures present a traditional
analysis of idealized particles and rigid bodies. Topics include force and moment balances, frames, trusses and pulleys, systems with friction, mass centers, area moments, and the linear and rotational kinetics and kinematics of rigid bodies. Weekly exercises apply fundamental principles to non-biological problems in two and three dimensions. Weekly problems extend the application to biological problems ranging from human motion to the mechanics of cells. In an end-of-term project students analyze human motion using the MATLAB programming language. This is a required course for BME majors typically taken in the sophomore year. 4 credits. Prerequisites: MTH 161 and 162, BME 101 and PHY 121.

201P. MATLAB for Biomedical Engineering.
Fundamentals of computer programming in MATLAB. Emphasis on programming basics, such as syntax, loop structures, logic, input/output, and graphics.

Introduction to electrical circuit theory. Examples will include bioelectric systems and signals and models of biological systems.

218. Introduction to Neuroengineering.
Introduces many aspects of neuroengineering research, with an emphasis on biologically plausible models of neurons, circuits, and systems.

221. Biomedical Computation and Statistics.
The application of numerical and statistical methods to model biological systems and interpret biological data, using the MATLAB programming language.

228. Physiological Control Systems.
This course introduces students to the theory and practice of control systems engineering. Topics include frequency domain modeling, time domain stability, transient and steady-state error analysis, root locus and frequency response techniques and feedback system design. Emphasis is placed on analyzing physiological control systems, but the concepts and design techniques are applicable and applied to a wide variety of other systems including mechanical and electrical systems. Graduate students will have more homework problems and additional exam problems.

Introduction to continuous and discrete time signals and linear time invariant systems, with applications to BME including imaging. Topics include convolution, Laplace and Z transforms, stability of systems, the Fourier series and transform, noise and filtering, and fundamental concepts in image processing and enhancement. Weekly homework assignments are supplemented with labs every other week. Two Midterms and a comprehensive final exam.

245. Biomaterials.
This course provides a background in biomaterials: basic material properties, specifies on ceramics, polymers and metals used in the body, and special topics related to biomaterials including tissue engineering, biological responses to implanted materials, and drug delivery.

251. Biomedical Ultrasound.
The course presents the physical basis for the use of high-frequency sound in medicine. Topics include acoustic properties of tissue, sound propagation (both linear and nonlinear) in tissues, interaction of ultrasound with gas bodies (acoustic cavitation and contrast agents), thermal and non-thermal biological effects of ultrasound, ultrasonography, dosimetry, hyperthermia and lithotripsy.

258. Human Anatomy.
Human Anatomy is the detailed study of the human organism at the cellular, tissue and organ systems levels. The relationship between structure and function is covered with emphasis on structural relationships. The course includes both lectures and laboratory sessions, an provides a basis for further professional and clinical experience. (Students should not take both BME (or BIO) 258 and BIO 203.)

259. Transport Phenomena in Biological Systems.
This course will provide an overview of transport phenomena in biological systems that are critical to the function of all living organisms. The fundamental laws and equations of transport phenomena will be applied to topics including cellular, cardiovascular, respiratory, liver and kidney transport, blood flow and rheology, and circulation in tissues and arteries.

260. Quantitative Physiology.
A quantitative, model-oriented approach to physiological systems is presented. Topics include muscle and nerve tissue, the cardiovascular system, the respiratory system, the renal system, and a variety of neural systems.

262. Cell and Tissue Engineering.
This course teaches the principles of modern cell and tissue engineering with a focus on understanding and manipulating the interactions between cells and their environment. After a brief overview of Cell and Tissue Engineering, the course covers 5 areas of the field. These are 1) Physiology for Tissue Engineering; 2) Bioreactors and Biomolecule Production; 3) Materials for Tissue Engineering; 4) Cell Cultures and Bioreactors; and 5) Drug Delivery and Drug Discovery. Within each of these topics the emphasis is on analytical skills and instructors will assume knowledge of chemistry, mass transfer, fluid mechanics, thermodynamics and physiology consistent with the Cell and Tissue Engineering Track in BME. In a term project, students must present written and oral reports on a developing or existing application of Cell and Tissue
Engineering. The reports must address the technology behind the application, the clinical need and any ethical implications.

267. Models and Simulations of BME Systems.
Introduction to analytical modeling and computational simulations of systems. Examples will include cardiovascular, respiratory, muscle, neural and population models. Analytical models for several physiological systems will be studied, and simulations will be written in Matlab.

270. Biomedical Microscopy.
This course covers the principles and practice of light microscopy as applied to biological and medical questions. Topics include basic light microscopy, DIC, phase epifluorescence, confocal and multiphoton laser-scanning microscopy, and selected methods such as CARS, FRET, FRAP, FCS, etc. This course is jointly listed as 470 for graduate students. Some homework problems are “470 only”.

274. Biomedical Sensors, Circuits, andInstrumentation.
Course will cover circuits and sensors used to measure physiological systems at an advanced level. Both signal conditioning and sensor characteristics will be addressed. Topics will include measurement of strain, pressure, flow, temperature, biopotentials, and physical circuit construction. The co-requisite laboratory will focus on the practical implementation of electronic devices for biomedical measurements.

Application of engineering mechanics to biological tissues including bone, soft tissue, cell membranes, and muscle. Realistic modeling of biological structures, including musculoskeletal joints and tissues. Experimental methods, computational examples and and material models. Investigations of the responses of biological tissues to mechanic factors.

295. BME Design Seminar.
Credit—2 hours
Introduction to design of medical devices and instruments. Students are introduced to methods and strategies for creative design while considering ethical, economic, regulatory and safety issues. In addition to benchmarking existing devices, students prepare for a design project to be completed in the following semester.

296. BME Design Project.
Senior capstone design course in the Biomedical Engineering Program. Students work in teams to design, build, and test a medical device or instrument for a faculty, community or industrial sponsor. Accompanying lectures and discussions introduce issues related to ethics, economics, project management, regulation, safety, and reliability. Students will work in teams to design, build and test a prototype medical device, and document their activities through a variety of reports and presentations


GRADUATE COURSES

The following graduate courses are open to advanced undergraduates with permission of the instructor.

442. Microbiomechanics.
Course covers the application of mechanical principles to biotechnology and to understanding life at its smallest scales. Topics vary with each course offering. Topics may include force generation by protein polymerization, mechanisms of bacterial motion, and the separation of biological molecules in porous media.

The aim of this class is to gain experience solving analytically intractable research problems using computational methods. At the beginning of the course, general numerical analysis topics are reviewed. The rest of the course is oriented toward projects. Examples will be drawn from problems of biological systems.

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 ultrasound computed tomography, and MRI.

453. Advanced Ultrasound Imaging.
This course investigates the imaging techniques applied in state-of-the-art ultrasound imaging and their theoretical bases. Topics include linear acoustic systems, spatial impulse responses, the k-space formulation, methods of acoustic field calculation, dynamic focusing and apodization, scattering, the statistics of acoustic speckle, speckle correlation, compounding techniques, phase aberration correction, velocity estimation, and flow imaging. A strong emphasis is placed on readings of original sources and student assignments and projects based on realistic acoustic simulations.

467. Models and Simulations of BME Systems.
Introduction to analytical modeling and computational simulations of systems. Examples will include cardiovascular, respiratory, muscle, neural and population models. Analytical models for several physiological systems will be studied, and simulations will be written in Matlab. Graduate students will do extra assignments.

This course focuses on the fundamental science underlying the mechanical behavior of cell membranes and the formation of
adhesive contacts between cells and between cells and substrates. Our approach is to explore mathematical descriptions of the physical properties of biomembrane structures as well as the physics and chemical basis of cell adhesion. Basic aspects of the structure and composition of cell membranes and the classes of adhesion molecules found on cells are reviewed as a basis for the mathematical treatments. The course is typically taught in the first half of the spring semester and designed for upper-level undergraduates and graduate students.

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### Chemical Engineering

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**Professor**

- **Shaw H. Chen, PhD (Minnesota)**
  Professor of Chemical Engineering and Senior Scientist in the Laboratory for Laser Energetics

- **Eldred H. Chimowitz, PhD (Connecticut)**
  Professor of Chemical Engineering

- **Jehuda Greener, PhD (Massachusetts, Amherst)**
  Adjunct Professor of Chemical Engineering

- **David R. Harding, PhD (Cambridge, England)**
  Professor of Chemical Engineering and Senior Scientist in the Laboratory for Laser Energetics

- **Stephen D. Jacobs, PhD (Rochester)**
  Professor of Chemical Engineering, of Materials Science, of Optics, and Senior Scientist in the Laboratory for Laser Energetics

- **Jacob Jorné, PhD (Berkeley)**
  Professor of Chemical Engineering

- **Lewis J. Rothberg, PhD (Harvard)**
  Professor of Chemical Engineering

- **Yonathan Shapir, PhD (Tel Aviv, Israel)**
  Professor of Physics, of Mathematics, and of Chemical Engineering

- **Ching W. Tang, PhD (Cornell)**
  Doris Johns Cherry Professor, Professor of Chemical Engineering, of Physics, and of Optics

- **David Wu, PhD (MIT)**
  Professor of Chemical Engineering, of Biomedical Engineering, and of Microbiology and Immunology

- **Hong Yang, PhD (Toronto)**
  Professor of Chemical Engineering and Scientist in the Laboratory for Laser Energetics

---

**Associate Professor**

- **Mitchell Anthamatten, PhD (MIT)**
  Associate Professor of Chemical Engineering and Scientist in the Laboratory for Laser Energetics

- **F. Douglas Kelley, PhD (Rochester)**
  Associate Professor of Chemical Engineering

- **Matthew Z. Yates, PhD (Texas)**
  Associate Professor of Chemical Engineering and Scientist in the Laboratory for Laser Energetics; Chair of the Department

---

**Assistant Professor**

- **Danielle Benoit, PhD (Colorado)**
  Assistant Professor of Biomedical Engineering, in the Center for Musculoskeletal Research, and of Chemical Engineering

- **David Foster, PhD (Rochester)**
  Assistant Professor Chemical Engineering

- **Alexander A. Shestopalov, PhD (Duke)**
  Assistant Professor of Chemical Engineering

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**Instructor**

- **Thor Olsen, Siv.Ing. (Technical University of Norway)**
  Instructor in Chemical Engineering
Chemical engineers apply the chemical and physical sciences to the solution of practical problems. They often work in business and industry but also use their engineering backgrounds in a wide variety of other occupations including the legal and medical professions. Some 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 the 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 (CHE) 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. These requirements should be met before entering the third year of undergraduate study. Typically, minimum competency is achieved by successfully completing CSC 160, Engineering of Computing. The course introduces students to programming methods useful in simulation work and numerical computation encountered in upper-level lecture and design courses.

First-Year Courses
The chemical engineering department provides ways for new students to gain a better understanding of what chemical engineers do. In the spring term, a chemical engineering elective, CHE 150, is taught to introduce students to problems where chemical engineering ideas are used to solve technical problems in an informal, project-oriented setting. In addition, several informal meetings are organized throughout the school year, in conjunction with the student chapter of the AIChE, to introduce students to professionals in local industry, so that students may gain a perspective on the wide variety of career opportunities open to chemical engineering graduates.

Typical Four-Year Program

<table>
<thead>
<tr>
<th>First Year</th>
<th>Second Year</th>
<th>Third Year</th>
<th>Fourth Year</th>
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</thead>
<tbody>
<tr>
<td>MTH 161</td>
<td>MTH 162</td>
<td>Elective</td>
<td>CHE 273</td>
</tr>
<tr>
<td>CHM 131</td>
<td>CHM 132</td>
<td>Elective</td>
<td>CHM/BIO/EES elective</td>
</tr>
<tr>
<td>Elective</td>
<td>PHY 121</td>
<td>CHE 244</td>
<td>CHE 275</td>
</tr>
<tr>
<td>WRT 105 (Primary Writing)</td>
<td>CHE 150</td>
<td>CHE 244</td>
<td>CHM 255</td>
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<td></td>
<td></td>
<td>CHE 275</td>
<td>CHM 251</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Elective</td>
<td>Elective</td>
</tr>
</tbody>
</table>
Educational Goals

- To educate students in the core chemical engineering and basic science subjects that constitute the modern intellectual basis for the chemical engineering profession.
- To educate students in methods of engineering analysis and design in an environment where problem solving, teamwork, and communication skills are emphasized.
- To provide students with knowledge and counseling that prepare them for admission to graduate programs in science and engineering, as well as professional employment in industry.
- To provide students with breadth in their education and a context in which to appreciate the potential lifelong societal contributions in their practice of the chemical engineering profession.

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 (ABET) and of the American Institute of Chemical Engineers (AIChE). Chemical engineering students are required to meet with their advisor each semester and demonstrate how their selection of courses will be used to meet department and accreditation requirements.

Electives

The BS program is described on the department’s website: www. che.rochester.edu. It consists of the equivalent of 31 4-credit courses plus two chemical engineering laboratories (for 6 credits), and an organic chemistry laboratory (the minimum number of credit hours being 132). Eleven courses (44 credit hours) in the four-year program are electives. One elective is a free elective (4 credit hours) and may be chosen however the student wishes. Five electives (that is, 20 credit hours) must be in the humanities or social sciences, with some courses selected in each area to provide breadth in the student’s program of study. Chemical engineering majors also must complete at least one approved cluster in a nontechnical subject area, in compliance with graduation requirements in the College. Generally, students choose to meet this cluster requirement by a judicious selection of their five humanities and social science electives. This option may not be possible for those who choose to do a cluster in business. An alternative is to earn a minor in a humanities or social science discipline. ENG 101 and 111–129 do not count toward this nontechnical course requirement in the chemical engineering program. The five remaining electives (20 credit hours) 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. MTH 164 is required.
2. One course (4 credits) must be in advanced chemistry or biology/biochemistry or earth and environmental sciences to supplement the four required chemistry courses explicitly identified in the typical four-year program below. In addition, chemistry-related courses in the chemical engineering department, such as CHE 286 or CHE 480, and certain courses in other departments, for example EES 206, 215, and 218, may be used as an advanced chemistry elective.
3. The three remaining technical courses (12 credits) must be science/engineering courses.
   
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 years and normally do not include more than one course at the 100 level. Qualified undergraduates should consider 400-level graduate courses, or personal research or design projects as technical electives, particularly if they are considering an application to the department’s 3+2 BS-MS program. Students are urged to consult widely and select their technical electives carefully. The department provides many opportunities for undergraduate students to pursue more in-depth study with individual faculty members. This can take on the form of independent research courses (CHE 395) or paid research internships over the summer months. Department strengths and focus areas include

- biotechnology—problems of common interest to biologists, biochemists, physicians, and engineers;
- polymers and advanced materials—their structure, properties, and manufacture;
- energy resources—fossil fuels, their production, chemical processing, and uses; other sources: solar and fuel cells, hydroelectric, geothermal, etc.;
- systems and controls—the behavior of complex chemical processes and their online control;
- environmental engineering—engineering methods applied to community or ecological problems;
- surface chemistry and catalysis—unique properties of interfaces separating solids, liquids, and gases;
- computer applications—computer use in chemical processing systems.

Chemical Engineering Major with Biomedical Minor

1. Required background—MTH 161, 162, and 165; CHM 131, and 132; and PHY 121 and 122 or equivalent
2. Required courses—BME 101; BIO 110, 111, and 111L; CHE 243; and two BME technical electives

Minor in Chemical Engineering

The minor in chemical engineering is especially appropriate for chemistry, mechanical engineering, and environmental science majors who want to broaden their background for work in the chemical process industry. It is also useful for students interested in technical management or careers that involve the assessment
of technology and society. The minor consists of a coherent sequence of 24 credits subject to the following restrictions:

1. Required background: CHM 131 and MTH 161 or equivalent.
2. 16 credits of chemical engineering courses from the following:
   - CHE 113
   - CHE 225
   - CHE 243
   - CHE 250
   - CHE 259
   - CHE 286
   - CHE 113
   - CHE 225
   - CHE 243
   - CHE 250
   - CHE 259
   - CHE 286
   - CHE 258 (2 credits)
   - CHE 282 (2 credits)
3. Exception: biomedical degree students with a Cell and Tissue concentration are required to take two courses in addition to CHE 225, 243, and 244.

### Minor in Environmental Engineering

1. Required background: CHE 150 or EES 103
2. Choose 12 credits from the following list (no more than 8 credits can be taken from one department). Students not majoring in engineering should take 12 of the 16 credits in engineering courses (CHE or ECE). Students majoring in engineering should take 12 of the 16 credits in sciences courses (EES or BIO).
   - CHE 113
   - CHE 231
   - CHE 244
   - CHE 258
   - CHE 264
   - CHE 273
   - ECE/TEE 590
   - EES 213
   - EES 215
   - EES 218
   - EES 283
   - BIO 263

### Upper-Level Writing Requirement

All students in the College must satisfy an upper-level writing requirement. Chemical engineering majors meet this requirement within the context of the two laboratory courses and the capstone design course (CHE 246, 255, and 273), all of which emphasize technical writing as well as oral communication and help students to refine these skills.

### Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

#### 113. Chemical Process Analysis.
Methodology and problem solving techniques in chemical engineering; the concepts of mass and energy conservation in both reacting and non-reacting chemical systems; the concept of equilibrium in chemical and physical systems and the basic principles of thermodynamics are presented; both steady state and transient behavior are discussed for some special systems.

Introduction to programming and computational approaches to engineering problems and their solution. Matlab language illustrates principles such as data representation, mathematical operations, looping and decisions, functions and subroutines, display and user interaction. Projects from several different engineering domains have subjects like linear algebra, differential equations, fitting data to models, signal processing, and the practical use of analog-digital converters in an experimental setting.

#### 150. Green Energy.
An introductory engineering course about energy production, conversion, and utilization. Course covers energy and power metrics, material and energy balances and the fundamental laws of thermodynamics and examines traditional and alternative energy sources, energy distribution, and energy utilization. Course activities include weekly homework assignments, exams, and a project. Emphasis is on assumption-based problem solving.

This course will provide an overview of several contemporary research topics pertaining to structured organic materials. Lectures will focus on intermolecular interactions and the thermodynamics of self-assembly. Additional lectures will introduce molecular crystals, polymer crystallinity, liquid crystals, self-assembled monolayers, surfactants, block copolymers, and biomimetic materials. Homework assignments and a brief technical presentation will be required. Advanced undergraduate students are welcome.

#### 225. Chemical Engineering Thermodynamics.
Lectures on the origin and use of the first and second laws of thermodynamics, followed by a discussion of equilibrium criteria. Thermodynamic descriptions of real gases and liquids are developed and applications of thermodynamics to phase and chemical equilibrium complete the course. Weekly problem assignments, problem review sessions, and student projects.

#### 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.

#### 243. Fluid Dynamics.
An introduction to the basic fluid flow and conservation laws of transport phenomena including the principles and applications
of fluid mechanics (momentum transport) to engineering problems. Topics include a detailed analysis of conservation of mass and momentum equations, microscopic and macroscopic balances, dimensional analysis and the application of fluid flow problems to chemical engineering.

244. Heat and Mass Transfer.
A fundamental course in heat transfer processes and an introduction to mass transfer. Topics include equations of energy conservation, conduction, convection, radiation; equations for chemical species conservation, diffusion, macroscopic balances. Emphasis on problem solving, especially for purposes of design.

246. Chemical Engineering Principles.
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 or 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. Chemical Processes.
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.

258. Electrochemical Engineering and Fuel Cells.
The course will concentrate on presenting the principles of electrochemistry and electrochemical engineering, and the design considerations for the development of fuel cells capable of satisfying the projected performance of an electric car. The course is expected to prepare you for the challenges of energy conversion and storage and the environment in the 21st century.

259. Transport Phenomena in Biological Systems.
This course will provide an overview of transport phenomena in biological systems that are critical to the function of all living organisms. The fundamental laws and equations of transport phenomena will be applied to topics including cellular, cardiovascular, respiratory, liver and kidney transport, blood flow and rheology, and circulation in tissues and arteries.

264. Biofuels.
This course will provide the student with a grounding in the fundamental principles of biofuels, including their sources, properties, and the biological and chemical processes by which they are made.

Credit—2 hours
Lectures, problem sets, and design projects. Introduction to the dynamic behavior of chemical engineering systems and to the analysis of feedback control systems. Methods of design of single feedback loops and multivariable systems are covered.

The course will cover material related to the conception and design of chemical processes. Topics will include energy systems analysis, the attainability region approach for reactor network synthesis and the effects of statistical uncertainty on decision making when evaluating alternative designs. Modern techniques for stochastic simulation of random processes will also be studied. The use of computational software packages like MATHCAD and DESIGN II will be expected in doing many of the homework assignments. In addition to two examinations, a computer-oriented design project will be assigned involving the use of chemical engineering principles for the solution of a process flow sheet problem. A good back ground in computer programming is necessary since many of the course assignments make use of numerical techniques.

279. Chemical Engineering Practice.
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 expose the versatility of a chemical engineering education.

282. Processing Microelectronic Devices.
This course features an overview of processes used in the fabrication of microelectronic devices, with emphasis on chemical engineering principles and methods of analysis. Modeling and processing of microelectronic devices. Includes introduction to physics and technology of solid state devices grade silicon, microlithography, thermal processing, chemical vapor deposition, etching and ion implantation and damascene processing.

286. Polymer Science and Engineering.
Mechanisms and kinetics of polymerization reactions; solution, suspension, and emulsion polymerization processes; thermodynamics of polymer solutions; characterization by membrane osmometry, light scattering, viscometry, and size exclusion chromatography; polymer rheology including linear viscoelasticity; polymer morphology and phase transitions.

292. Biointerfaces.
The course will focus on interfacial phenomena in hybrid bio-inorganic systems. The goal of the course is to increase the understanding of interactions between biomolecules and surfaces. The course will aim at investigating the behavior of complex macromolecular systems at material interfaces and the importance of
such systems in the fields of biology, biotechnology, diagnostics, and medicine. The first part of the course will focus on mechanisms of interactions between biomolecules and surfaces. The second part will focus on the characterization of physical, chemical, and morphological properties of biointerfaces.

**GRADUATE COURSES**

The following graduate courses are open to advanced undergraduates with permission of the instructor.

**413. Engineering of Soft Matter.**

This course will provide an overview of several contemporary research topics pertaining to structured organic materials. Lectures will focus on intermolecular interactions and the thermodynamics of self-assembly. Additional lectures will introduce molecular crystals, polymer crystallinity, liquid crystals, self-assembled monolayers, surfactants, block copolymers, and biomimetic materials. Homework assignments and a brief technical presentation will be required. Advanced undergraduate students are welcome.

**430. Organic Electronics.**


**441. Advanced Transport Phenomenon.**

This course will acquaint the student with important topics in advanced transport phenomena (momentum, heat and mass transport). Topics include laminar and turbulent flow, thermal conductivity and the energy equation, molecular mass transport and diffusion with heterogeneous and homogeneous chemical reactions. Focus will be to develop physical understanding of principles discussed and with emphasis on chemical engineering applications. In addition to the text, the student will be exposed to classic and current literature in the field.

**447. Liquid Crystal Optics.**  
*Same as OPT 392 and 492*

**454. Interfacial Engineering.**

Lectures on the fundamentals of colloids and interfaces, systems with high interfacial area, and their role in modern processes and products. Topics include interfacial tension, contact angle, adsorption, surfactants, micelles, microemulsions, and colloidal dispersions. Techniques for formation and characterization of interfaces and colloids will be reviewed.

**458. Electrochemical Engineering and Fuel Cells.**  
*Same as CHE 258*  
Credit—2 hours

**460. Solar Cells.**

This course will introduce students to the basics of photovoltaic devices: physics of semiconductors; pn junctions; Schottky barriers; processes governing carrier generation, transport and recombination; analysis of solar cell efficiency; crystalline and thin-film solar cells, tandem structures, dye-sensitized and organic solar cells. Students will learn about current photovoltaic technologies including manufacturing processes, and also the economics of solar cells as an alternative energy source. Critical analysis of recent advances and key publications will be a part of the course work.

**462. Cell and Tissue Engineering.**

Teaches the principles of modern cell and tissue engineering with a focus on understanding and manipulating the interactions between cells and their environment. After a brief overview of Cell and Tissue Engineering, the course covers 5 areas of the field. 1) Physiology for Tissue Engineering; 2) Bioreactors and biomolecule production; 3) Materials for Tissue Engineering; 4) Cell Cultures and bioreactors and 5) Drug Delivery and Drug Discovery.

**464. Biofuels.**

This course will provide the student with a grounding in the fundamental principles of biofuels, including their sources, properties, and the biological and chemical processes by which they are made.

**469. Biotechnology and Bioengineering.**

The life science and engineering principles underlying biotechnology processes; established biotechnology processes including microbial and enzyme conversions, metabolic pathways, and fermentation kinetics; tools for biotechnology development including the recombinant DNA and monoclonal antibody techniques; emerging areas at the forefront of biotechnology, including immune technology and tissue and organ cultures.

**480. Chemistry of Advanced Materials.**

Preparation, structure, composition, and properties of advanced materials with emphasis on the underlying chemistry. Atomic structure and bonding of crystalline and amorphous solids and crystalline defect. Materials synthesis and processing by chemical and physical deposition methods. Focus on the relation of structure to properties of materials. Selected topics to illustrate the basic concepts and principles will include thin film materials, nanosstructure/nanoscal/ nanocomposite materials, and bulk materials.

**482. Processing Microelectronic Devices.**  
*Same as CHE 282*  
Credit—2 hours
485. Thermodynamics and Statistical Mechanics.
Introduction to the topic: Thermodynamics and Statistical Mechanics. In the beginning macroscopic thermodynamics including phase equilibria and stability concepts will be covered followed by material related to the principles of statistical mechanics. Applications to various modern areas of the topic will be examined including the Monte Carlo simulation method, critical phenomena and diffusion in disordered media. The course will require completion of a project as well as regular homework assignments.

486. Polymer Science and Engineering.
Mechanisms and kinetics of polymerization reactions; solution, suspension, and emulsion polymerization processes; thermodynamics of polymer solutions; the Flory-Huggins theory; principles and practice of membrane osmometry, light scattering, viscometry, and size exclusion chromatography; polymer rheology and mechanical properties; polymer morphology and phase transitions.

492. Biointerfaces.
The course will focus on interfacial phenomena in hybrid biomolecular systems. The goal of the course is to increase the understanding of interactions between biomolecules and surfaces. The course will aim at investigating the behavior of complex macromolecular systems at material interfaces and the importance of such systems in the fields of biology, biotechnology, diagnostics, and medicine. The first part of the course will focus on mechanisms of interactions between biomolecules and surfaces. The second part will focus on the characterization of physical, chemical, and morphological properties of biointerfaces.

Computer Science

Professor

James F. Allen, PhD (Toronto)
John H. Dessauer Professor of Computer Science, Professor of Linguistics and of Brain and Cognitive Sciences

Christopher M. Brown, PhD (Chicago)
Professor of Computer Science

Sandhya Dwarkadas, PhD (Rice)
Professor of Computer Science and of Electrical and Computer Science

Lane A. Hemaspaandra, PhD (Cornell)
Professor of Computer Science

Robert A. Jacobs, PhD (Massachusetts)
Professor of Brain and Cognitive Sciences, of Psychology, of Computer Science, and in the Center for Visual Science

Henry Kautz, PhD (Rochester)
Professor of Computer Science; Chair of the Department; Professor of Chemical Engineering and Senior Scientist in the Laboratory for Laser Energetics

David C. Knill, PhD (Brown)
Professor of Brain and Cognitive Sciences, of Computer Science, and in the Center for Visual Science

Lenhart K. Schubert, PhD (Toronto)
Professor of Computer Science

Michael L. Scott, PhD (Wisconsin)
Professor of Computer Science

Associate Professor

Chen Ding, PhD (Rice)
Associate Professor of Computer Science

Daniel Gildea, PhD (California, Berkeley)
Associate Professor of Computer Science

Wendi B. Heinzelman, PhD (MIT)
Associate Professor of Electrical and Computer Engineering and of Computer Science; Dean of Graduate Studies

Michael Huang, PhD (Illinois at Urbana/Champaign)
Associate Professor of Electrical and Computer Engineering and of Computer Science

Randal C. Nelson, PhD (Maryland)
Associate Professor of Computer Science

Joel I. Seiferas, PhD (MIT)
Associate Professor of Computer Science

Kai Shen, PhD (California, Santa Barbara)
Associate Professor of Computer Science

Assistant Professor

Jeffrey Bigham, PhD (Washington)
Assistant Professor of Computer Science

T. Florian Jaeger, PhD (Stanford)
Assistant Professor of Brain and Cognitive Sciences and of Computer Science

Engin Ipek, PhD (Cornell)
Assistant Professor of Computer Science and of Electrical and Computer Engineering

Daniel Stefankovic, PhD (Chicago)
Assistant Professor of Computer Science

Muthuramakrishnan Venkitasubramaniam, PhD (SUNY, Buffalo)
Assistant Professor of Computer Science
The department uses 15 to 20 teaching assistants as graders, workshop leaders, or laboratory leaders.

The Department of Computer Science offers BA, BS, MS, and PhD degrees in computer science. We offer a broad range of courses in systems, theory, human computer interaction, and artificial intelligence. The goal is to help students become fluent in algorithmic thought, core skills and concepts, and state-of-the-art implementation techniques. All of our students have exceptional participatory access to advanced courses and to a faculty composed of prominent researchers in areas such as parallel hardware and software, programming languages, computational complexity, randomized algorithms, machine vision, human-computer interaction, machine learning, and natural language processing. Research experiences play a large part in the undergraduate programs, and many BA and BS students become involved in the department’s research program during their junior and senior years. Our faculty and staff frequently help students find jobs and internships at leading high-tech corporations and major research laboratories.

The BS curriculum is structured to provide a broad grounding in the conceptual and mathematical foundations of the field that are the enduring foundations of computer science. The BA curriculum is less structured: students may take academic advantage of the many other outstanding disciplines at the University of Rochester (e.g., music, biology, political science, brain and cognitive sciences, etc.) for which computing is a powerful enabler. There are several ways to convert BS to BA programs (and vice versa).

The computer science department’s web page (www.cs.rochester.edu) has details of its academic programs (BS, BA, minor, and 3-2).

### Departmental Distinction

Departmental distinction in computer science, for both the BA and BS degrees, are determined by the student’s GPA on the courses that constitute the program of study for the major. The minimum scores for the three levels of distinction are 3.3 (Distinction), 3.5 (High Distinction), and 3.7 (Highest Distinction).

### Upper-Level Writing Requirements

Computer science majors must develop, in consultation with their advisor, a plan that includes two upper-level writing “experiences.” Each experience must generate at least 25 pages of expository prose, with substantial feedback on content and form, and revision of the work. The 25 pages may be in the form of a single major paper or a series of smaller papers in a coherent context, e.g., a course. The plan must be described in writing on a form signed by both the students and the advisor. Full information is available from the department.

### Industry Practicum

An elective industrial partnership program has been developed that allows students to spend up to six months (usually a summer and an adjacent semester) working in an industrial setting. Graduation thus is delayed one semester. Interested students should plan their studies to ensure that all their academic program requirements are met despite the semester away.

### Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.


A practical introduction to computing and computer applications. Lab required. There are no prerequisites. Leads into these clusters: Business Computing, Computer Science and Art, and Computing for the Social Sciences. Not open to officially declared CSC majors.

#### 131. Recreational Graphics I.

A hands on introduction to 3D computer graphics and animation techniques taught from a user point of view. Topics include 3D modeling, animation, and simulation. Assessment based on projects. No written exams.


Introduction to programming and computational approaches to engineering problems and their solution. Matlab language illustrates principles such as data representation, mathematical operations, looping and decisions, functions and subroutines, display and user interaction. Projects from several different engineering domains have subjects like linear algebra, differential equations, fitting data to models, signal processing, and the practical use of analog-digital converters in an experimental setting.

#### 161. The Art of Programming.

Organized thinking, creative problem solving, and the precise description of solutions are valuable skills in academia and life. The formulation and solution of problems using computers is increasingly important in all artistic and scholarly fields. We introduce core concepts and techniques of programming as a way to develop these skills, as basis for further CS study, and for application to other fields. Lab required.

#### 166. Video Game Programming.

Do you like to play video games? Why not learn how to make one? This course is a hands-on lab based introduction to software engineering and computer programming using the development of computer/video games as the application area. The course is taught using the C# language with the XNA game development framework targeting applications for the XBOX360 game platform. Students will learn the basics of computer programming
and the basics of the management and development processes of software engineering. This course is intended for students with little or no previous programming experience.

170. Introduction to Computer Programming.
The course is a hands-on introduction to computer programming using the JavaScript computer language in the context of web pages. You will learn to program a computer by writing web pages that include computer programs. Topics covered will include Web 2.0 concepts, web browser basics, XHTML, CSS, Javascript, computer systems architecture, etc.

171. The Science of Programming.
Discovering, formulating, and exploiting the structure of problems to aid in their solution by computer. An introduction to algorithmic problem solving and computer programming in Java.

172. The Science of Data Structures.
Abstract data types (e.g., sets, mappings, and graphs) and their implementation as concrete data structures in Java. Analysis of the running times of programs operating on such data structures, and basic techniques for program design, analysis, and proof of correctness (e.g., induction and recursion). Lab required.

Investigation of several formal systems influential in computer science, and also some of their applications (e.g. inspiring and providing the foundation for a computer programming style, or providing the basis for solving important practical problems like communications protocols, compiling, systems analysis, graphics).

200. Undergraduate Problem Seminar.
Intensive seminar on cooperative problem solving. Overview of the subdisciplines and the research of the University of Rochester’s computer science faculty. CSC 200H required for the Honors BS in computer science; CSC 200 required for the BS. Students taking CSC 200H may have additional reading, assignments, or projects.

An introduction to the technology, design and science of web programming. This course will cover the base material needed to create and deploy secure, usable database-driven web applications, including topics selected from programming, networking, databases, security, and usability. Specific technologies and languages covered will include HTML, Javascript, Document Object Model (DOM), PHP, MySQL, Ruby on Rails, XML, AJAX, and Flash.

An introduction to the technology, design and science of web programming. This course will cover the base material needed to create and deploy secure, usable database-driven web applications, including topics selected from programming, networking, databases, security, and usability. Specific technologies and languages covered will include HTML, Javascript, Document Object Model (DOM), PHP, MySQL, Ruby on Rails, XML, AJAX, and Flash.

242. Artificial Intelligence.
Introduces fundamental principles of artificial intelligence, including heuristic search, automated reasoning, handling uncertainty, and machine learning. Presents applications of AI techniques to real-world problems such as understanding the web, computer games, biomedical research, and assistive systems. This course is a prerequisite for advanced AI courses.

244. Logical Foundations of AI.
An introduction to the logical foundations of AI, including first-order logic, search, knowledge representation, planning. Students taking this course at the 400 level will be required to complete additional readings and/or assignments, including a significant project or essay.

246. Mathematical Foundations of AI.
This course presents the mathematical foundations of AI, including probability, decision theory and machine learning.

247. Natural Language Processing.
An introduction to natural language processing; constructing computer programs that understand natural language. Topics include parsing, semantic analysis, and knowledge representation. CSC 447, a graduate-level course, requires additional readings and assignments.

248. Statistical Speech and Language Processing.
An introduction to statistical natural language processing and automatic speech recognition techniques. This course presents the theory and practice behind the recently developed language processing technologies that enable applications such as speech-driven dictation systems, document search engines (e.g., finding web pages) and automatic machine translation. Students taking this course at the 400 level will be required to complete additional readings and/or assignments.

Introduction to computer vision, including camera models, basic image processing, pattern and object recognition, and elements of human vision. Specific topics include geometric issues, statistical models, Hough transforms, color theory, texture, and optic flow. CSC 449, a graduate-level course, requires additional readings and assignments.

Introduction to computer architecture and the layering of hardware/software systems. Topics include instruction set design; logical building blocks; computer arithmetic; processor
organization; the memory hierarchy (registers, caches, main memory, and secondary storage); I/O—buses, devices, and interrupts; microcode and assembly language; virtual machines; the roles of the assembler, linker, compiler, and operating system; technological trends and the future of computing hardware. Several programming assignments required.


Design and implementation of programming languages, with an emphasis on imperative languages and on implementation tradeoffs. In-depth examination of “how programming languages work.” Topics include fundamental language concepts (names, values, types, abstraction, control flow); compilation and interpretation (syntactic and semantic analysis, code generation and optimization); major language paradigms (imperative, object-oriented, functional, logic-based, concurrent). Course projects include assignments in several different languages, with an emphasis on compilation issues.


With the increasing diversity and complexity of computers and their applications, the development of efficient, reliable software has become increasingly dependent on automatic support from compilers & other program analysis and translation tools. This course covers principal topics in understanding and transforming programs at the assembly, function, and program levels. Specific techniques for imperative languages include data flow, dependence, and inter-procedural analyses; resource allocation; and program transformation for locality and parallelism. The course will also touch on theoretical issues in program semantics for higher order languages. Course projects include a program analyzer and optimizer for a subset of the C programming language. Meets jointly with CSC 455, a graduate-level course that requires additional readings and assignments.

256. Operating Systems.

Principles of operating system design, explored within the practical context of traditional, embedded, distributed, and real-time operating systems. Topics include device management, process management, scheduling, synchronization principles, memory management and virtual memory, file management and remote files, protection and security, fault tolerance, networks, and distributed computing. CSC 456, a graduate-level course, requires additional readings and assignments.

257. Computer Networks.


258. Parallel and Distributed Systems.

Principles of parallel and distributed systems, and the associated implementation and performance issues. Topics covered will include programming interfaces to parallel and distributed computing, interprocess communication, synchronization, and consistency models, fault tolerance and reliability, distributed process management, distributed file systems, multiprocessor architectures, parallel program optimization, and parallelizing compilers. Students taking this course at the 400 level will be required to complete additional readings and/or assignments.


This course will examine recent research in computational linguistics and artificial intelligence on natural language dialog systems. Students will take turns leading the discussion of current research papers. Undergraduates taking the course for credit will also be required to prepare a written review of one of the papers. Graduates taking the course may have additional readings or assignments. It may be repeated for credit with permission of the instructor.


This course studies fundamental computer models and their computational limitations. Finite-state machines and pumping lemmas, the Chomsky hierarchy, Turing machines and algorithmic universality, noncomputability and undecidability, tradeoffs between power and formal tractability.

281. Cryptography.

Modern study of cryptography investigates techniques for facilitating interactions between distrustful entities. In this course we introduce some of the fundamental concepts of this study. Emphasis will be placed on the foundations of cryptography and in particular on precise definitions and proof techniques.

282. Design and Analysis of Efficient Algorithms.

How does one design programs and ascertain their efficiency? Divide-and-conquer techniques, string processing, graph algorithms, mathematical algorithms. Advanced data structures such as balanced tree schemes. Introduction to NP-completeness and intractable combinatorial search, optimization, and decision problems.
286. Computational Complexity.
This course continues the development of the theory of computing begun in CSC 280. Topics include the formal characterization of computational hardness; one-way functions and cryptography; the complexity hierarchy; and information theory.

287. Advanced Modes of Computation.
Advanced modes of computation such as probabilistic computation, counting-based computation, semi-feasible computation, nondeterminism, computation trees, and parallel access. CSC 487, a graduate-level course, requires additional readings and assignments.

SPECIAL COURSES

390. Supervised Teaching.

391. Independent Study.

391H. Independent Study-Honors.

393. Senior Project.

393H. Senior Project-Honors.

394. Internship.

395. Research.

395H. Honors Senior Thesis.

Electrical and Computer Engineering

Professor

David Blackstock, PhD (Harvard)
Visiting Professor of Electrical and Computer Engineering

Mark Bocko, PhD (Rochester)
Professor of Electrical and Computer Engineering and of Physics and Astronomy; Technical Director, Center for Future Health; Affiliated Faculty, Eastman School of Music, Music Theory

Victor V. Derefinko, MS (Virginia)
Adjunct Professor of Electrical and Computer Engineering

William R. Donaldson, PhD (Cornell)
Professor of Electrical and Computer Engineering

Sandhya Dwarkadas, PhD (Rice)
Professor of Computer Science and of Electrical and Computer Engineering

Philippe M. Fauchet, PhD (Stanford)
Distinguished Professor of Electrical and Computer Engineering, Professor of Materials Science, of Biomedical Engineering, of Optics, and Senior Scientist in the Laboratory for Laser Energetics; Director of University of Rochester Energy Research Initiative

James R. Fienup, PhD (Stanford)
Robert E. Hopkins Professor of Optics, Professor in the Center for Visual Sciences, of Electrical and Computer Engineering, and Senior Scientist in the Laboratory for Laser Energetics

Eby G. Friedman, PhD (California, Irvine)
Distinguished Professor of Electrical and Computer Engineering

Dave Headlam, PhD (Michigan)
Professor of Music Theory, ESM

Thomas Y. Hsiang, PhD (California, Berkeley)
Professor of Electrical and Computer Engineering; Associate Dean for Undergraduate Programs, Edmund A. Hajim School of Engineering and Applied Sciences

Thomas B. Jones, PhD (MIT)
Professor of Electrical and Computer Engineering

Ruola Ning, PhD (University of Utah)
Professor of Electrical and Computer Engineering

Kevin J. Parker, PhD (MIT)
William F. May Professor of Engineering, Professor of Electrical and Computer Engineering, of Biomedical Engineering, and of Imaging Sciences

Roman Sobolewski, PhD (Warsaw)
Professor of Electrical and Computer Engineering, of Materials Science, and of Physics, and Senior Scientist in the Laboratory for Laser Energetics

A. Murat Tekalp, PhD (Rensselaer)
Adjunct Professor of Electrical and Computer Engineering

Robert C. Waag, PhD (Cornell)
Arthur Gould Yates Professor of Engineering, Professor of Electrical and Computer Engineering and of Imaging Sciences

Associate Professor

David Albonesi, PhD (Massachusetts)
Adjunct Associate Professor of Electrical and Computer Engineering

Paul Ampadu, PhD (Cornell)
Associate Professor of Electrical and Computer Engineering
Much of the modern technological landscape has been shaped by electrical and computer engineers. Technologies such as the Internet, television, wireless phones, and digital audio make possible many new and productive activities. To turn ideas into reality, electrical and computer engineers need to understand the physical principles underlying electrical phenomena and the mathematics 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 effectively. Finally, they need to keep themselves informed of new developments in science and technology in order to meet tomorrow’s challenges.

Our mission is to provide our students with the knowledge and skills that will enable them to build productive careers in the field of electrical and computer engineering. We teach our students the principles and good practices of modern basic and applied electrical and computer engineering. We train them to solve problems systematically, yet to think creatively, and we develop in them an awareness of the role of engineering in modern society.

The electrical and computer engineering (ECE) curriculum at the University of Rochester encourages students to pursue individual interests and goals with respect to both general educational and professional training. The curriculum emphasizes fundamentals that prepare students for lifelong learning to meet the career challenges presented by rapidly changing technologies. The electrical and computer engineering department’s nationally recognized faculty and laboratories, combined with an outstanding faculty-to-student ratio, create the ideal environment for training the twenty-first-century engineer.

Curricular flexibility in the third and fourth years permits specialization in signals and communications, solid state devices and microelectronics, computer engineering, and electromagnetic fields, waves, and devices. 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.

The curriculum is based on a set of lower- and upper-division core courses required of all students and emphasizes the application of mathematical, computer, and physical concepts to the solution of engineering problems. Nearly all undergraduate ECE courses include laboratory work intended to provide students with extensive design experience.

By the senior year all students select an area of concentration, which specifies upper-division courses and a senior design project. The senior design project is carried out under the supervision of an electrical and computer 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 (ECE 396).

A distinctive feature of the curriculum is the removal of artificial boundaries between undergraduate and graduate courses. Undergraduates may take basic graduate courses in addition to advanced undergraduate electives. This feature facilitates preparation for graduate study in electrical and computer engineering in related areas such as computer science.

Our objectives are to:

- develop within graduates a basic foundation of knowledge in six fundamental areas of electrical and computer engineering (circuits and systems, electromagnetics, microelectronics, digital systems, computer architecture, signals and communications) with additional depth and design experience in at least one area;
• develop in students the proficiency in engineering analysis and synthesis needed for the professional practice of electrical and computer engineering;
• help students to develop the skills necessary to function effectively on an engineering team;
• develop within graduates the ability to communicate effectively with the technical community and the general public;
• instill in graduates an appreciation of and enthusiasm for research, creativity, and lifelong inquiry;
• foster within our graduates an appreciation for the need to maintain the highest ethical standards in their professional lives;
• provide students with the breadth to pursue opportunities in nontraditional fields within or outside electrical and computer engineering.

Below is the standard four-year, 128-credit-hour electrical and computer engineering curriculum, showing the University requirements, electrical and computer engineering core courses, and other departmental requirements. The order of completion of upper-division requirements is primarily the decision of the students and their advisor, although attention must be given early in the program planning process to prerequisites.

Accreditation

The ECE program meets the professional accreditation requirements established by the Accreditation Board of Engineering and Technology (ABET) and the Institute of Electrical and Electronics Engineers (IEEE).

Upon completion of the BS ECE program, graduates are eligible to take the Fundamentals of Engineering Examination, which is the first step in earning professional registration.

Admission

To be considered for admission to the major in electrical and computer engineering, students complete the following: the required first- and second-year courses (ECE 111, 112, 113, and CSC 160) or equivalent, with a minimum grade point average of 2.3; complete MTH 161, 162, 165, 164, or equivalent mathematics sequence; and PHY 121, 122, 123 (or other natural science course in place of PHY 123). Students must also have completed the University primary writing requirement (WRT 105). In addition, a minimum grade point average of 2.0 must be achieved overall. The four required ECE courses, ECE 111, 112, 113, and CSC 160, must be taken at the University of Rochester. An exception is made for students who have been admitted directly into the program via the transfer admission process. Only courses taken at Rochester are used in calculating the grade point average.

Students who wish to major in electrical and computer engineering are required to file a Major Approval Form approved by their faculty advisor, usually during the fourth semester of study. For graduation, electrical and computer engineering majors are required to achieve a cumulative grade point average of at least 2.0 in the 12 courses constituting the ECE undergraduate core.

Students who desire a more flexible program and who elect to forego an ABET-accredited degree may plan a degree program leading to a BA in engineering science or plan a degree program under the Interdepartmental Programs.

BS-MS in Electrical and Computer Engineering

Electrical and computer engineering juniors are encouraged to consider the special five-year program outlined below. Students are accepted into this program in the spring of their junior year and can begin graduate-level independent work in their senior year. At the end of the five-year program, both a BS and an MS in electrical and computer engineering are awarded. Students may pursue either a Plan A (with thesis) or a Plan B (with a comprehensive examination) MS degree program.

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 cores courses by the end of their junior year. Students admitted to the program may also be considered for financial aid in the fifth year.

Standard Four-Year Program

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<tr>
<th>First Year</th>
<th>Second Year</th>
<th>Third and Fourth Year</th>
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<tr>
<td>EAS 1XX or ECE 140</td>
<td>MTH 161</td>
<td>ECE 211</td>
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<tr>
<td>WRT 105 (Primary Writing)</td>
<td>Elective (hum. or social science)/natural science</td>
<td>ECE 231</td>
</tr>
<tr>
<td>CSC 160</td>
<td>MTH 162</td>
<td>ECE 230</td>
</tr>
<tr>
<td>PHY 121</td>
<td>Elective (hum. or social science)/natural science</td>
<td>ECE 222, 216</td>
</tr>
<tr>
<td>MTH 164</td>
<td>PHY 123 or natural science/elective (hum. or social science)</td>
<td>ECE 200</td>
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- Plus the following:
  - 1 ECE advanced elective course
  - 1 ECE capstone design course
  - ECE 398 (2 credits), Engineering Design Seminar
  - Free electives to complete the balance of 128 credit hours
- Acceptable alternative mathematics sequences: honors math sequence MTH 171, 172, 173, 174 is perfectly appropriate for those with adequate mathematics background. The sequence MTH 141, 142, 143, 165, 164 is acceptable,
Two physics courses, PHY 121 and PHY 122, are required of all ECE majors. In addition, it is strongly recommended that ECE students also complete PHY 123. However, selected other courses in natural science among AST, BCS, BIO, CHM, EES, and PHY may also satisfy the ECE program’s natural science requirement. Students must check with the ECE department undergraduate coordinator prior to taking any such course to confirm that the course satisfies the ECE natural science requirement.

In the ECE program, a total of five courses in the humanities and social sciences is required. Three of these courses must constitute an approved cluster in humanities or social sciences and must be passed with a 2.0 average or better. See the Cluster Search Engine (www.rochester.edu/College/CCAS/clusters) and descriptions of clusters in the undergraduate bulletin.

ECE 270 or MTH 201, Introduction to Probability, is required for all ECE majors. Students should normally take MTH 201 concurrently with ECE 241, but in any case MTH 201 must be taken prior to taking ECE 242.

For graduation, electrical and computer engineering majors must achieve a minimum cumulative grade point average of 2.0 in the 12 required ECE core courses: specifically ECE 111, 112, 113, 200, 216, 221, 222, 230, 241, 242, CSC 160 and 349. In addition, 12.8 total credits are required for graduation with an overall cumulative grade point average of 2.0.

A total of 12 ECE courses, as well as an ECE capstone design course plus the two seminar courses, ECE 398 and 399, are required for graduation. ECE 399 should be taken in the junior year and ECE 398 must be satisfactorily completed, usually in the fall term of the senior year, prior to undertaking the capstone design course.

The upper-level writing requirement is satisfied by ECE 111, 112, 113, and 399 fulfill the College upper-level writing requirements.

Courses of Instruction
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

111. Introduction to Signals and Circuits.
Analysis techniques for DC and AC circuits.

112. Logic Design.
Fundamentals of digital logic design methodology including analysis, synthesis, optimization, simulation, and implementation.

113. Circuits and Signals.
Signal representation with applications to circuits: AC circuits and phasors, complex frequency, amplifiers and filters, resonance, two-port networks, Laplace transforms. Fourier series, Fourier transforms.

140. Introduction to Digital Music.

Instruction set principles; processor design, pipelining, data and control hazards; datapath and computer arithmetic; memory systems; I/O and peripheral devices; internetworking, HDL


210. Circuits and Microcontrollers for Engineers.
Current, Voltage, Components, Microcontrollers, Sources, Operational Amplifiers, Analysis Techniques, First and Second Order Circuits, Timing with Microcontrollers, Sinusoids and AC, Controlling Motors and Power Circuits.

216. Microprocessors and Data Conversion.
221. Electronic Devices and Circuits.
Introduction to the physics and operation of semiconductor devices and to the design and analysis of basic electronic circuits.

222. Integrated Circuits: Design and Analysis.
Design and analysis of digital and analog integrated circuits. Technologies, such as NMOS, CMOS, GaAs, Bipolar, and BiCMOS. Semiconductor processing.

223. Semi-Conductor Devices.

Important elements of electric power, from conversion to consumption. How the principal sources of energy—coal, natural gas, impounded water (hydroelectric), and fossil materials—are exploited to create electric power, how it is distributed through the grid and then how it is consumed. Informed analysis of the true prospects and technological challenges of new energy sources, such as biomass, wind power, and oil shales, and assessment of the opportunities to improve distribution and usage efficiency through a Smart Grid.


Static and quasistatic fields for micro-electromechanical transducers and certain microfluidic schemes. Capacitance models, lumped parameter electromechanics, and two-port device descriptions. Reciprocity and sensitivity issues.

235. Introduction to Optoelectronics.
Introduction to fundamentals of wave propagation in materials, waveguides and fibers, generation, modulation and detection of light using semiconductor devices, and elements of optocommunication systems.

Engineering and physical science concepts underlying musical sound analysis and synthesis. Oscillation, waves, impedance, musical instrument sound production, digital representation of musical signals, spectra, digital filtering, subtractive and additive music synthesis, FM synthesis, sampling, physical modeling.

241. Signals.
Introduction to continuous and discrete 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.


244. Digital Communications.
Digital communication system elements. Digital transmission, binary and M-ary modulation schemes, demodulation and detection, coherent and incoherent demodulators, error performance. Channel capacity, mutual information, simple discrete channels and the AWGN channel. Basics of channel coding and error correction codes.

245. Wireless Communications.
Concepts behind traditional cellular radio and wireless data networks (e.g., channel coding, medium-access) as well as design trade-offs among RF bandwidth, transmitter and receiver power and cost, and system performance.

Analysis and design of discrete-time signals and systems, including difference equations, discrete-time filtering, z-transforms, A/D and D/A conversions, multi-rate signal processing, FIR and IIR filter design, the Discrete Fourier Transform (DFT), circular convolution, Fast Fourier Transform (FFT) algorithms, windowing, and classical spectral analysis.

253. Dynamic Systems and Control.
Dynamic systems and linear control. The course emphasizes a state space approach. Topics covered include state-space models, modes, stability, controllability, observability, transfer function matrices, poles and zeros, and state feedback.

261. Introduction to VLSI.

262. Advanced CMOS/VLSI Design.
Review of CMOS Subsystem design. Project design requirements include architectural design, logic and timing verification, layout design, and test pattern generation. The resulting VLSI chips may be fabricated.
266. RF and Microwave Integrated Circuits.
Analysis and design of radio-frequency (RF) and microwave integrated circuits at the transistor level. Smith chart, s-parameters, and EM simulation. High-frequency narrow-band amplifiers, wideband amplifiers, low-noise amplifiers (LNA). Nonlinear circuits, oscillators and phase noise, phase-locked loops (PLL) and frequency synthesizers.

269. High-Speed Integrated Electronics.
Integrated electronics in high speed and wideband applications, which spans the fields of wireless communications, computing, fiber optics, and instrumentation. High speed semiconductor technologies (CMOS, SiGe, SOI, GaAs, InP, etc) and devices (MOSFET, MESFET, HEMT, HBT, and tunneling diodes), design of high speed phase locked and delay-locked loops (PLL and DLL). VCO, frequency divider, phase detector, and loop filter.

270. Introduction to Probability.
Basic concepts of probability theory, combinatorial analysis, discrete and continuous random variables (RVs), pairs of RVs, vector random variables, estimation of a RV, Central Limit Theorem, and an introduction to random processes.

349. Senior Design.
Final senior project design.

398. Design Seminar.
 Students majoring in Electrical and Computer Engineering will take this course at the same time as their concentration elective and prepare a proposal for the Design Project to be carried out in the Spring semester. Students and instructor will consult with design project supervisors in various areas to devise a plan. Proposal might include: definition of project requirements and product specifications, clarification and verification of end user requirements, subsystem definition and interfaces, generation of project and testing plans, reliability analysis, product safety, compliance issues, manufacturability, cost, and documentation.

399. Junior Seminar.
Study of ethical, social, economic and safety considerations that arise in engineering practice by discussion of appropriate novels, movies, essays, videos and other materials. Presentations by outside speakers.

GRADUATE COURSES

The following graduate courses are open to advanced undergraduates with permission of the instructor.


404. High-Performance Microprocessor-Based Systems.
This course provides in-depth discussions of the design and implementation issues of microprocessors and general-purpose computing systems based on them.

423. Semi-Conductor Devices.
Modern solid state devices, their physics and principles of operation. Solid state physics fundamentals, free electrons, band theory, transport properties of semiconductors, tunneling. Semiconductor junctions and transistors. Compound and semimagnetic semiconductors. Optoelectronic and ultrafast devices.

432. Acoustical Waves.
Acoustic wave equation; plane, spherical, and cylindrical wave propagation; reflection and transmission at boundaries; normal modes; absorption and dispersion; radiation from points, spheres, cylinders, pistons, and arrays; diffraction; nonlinear acoustics.

Engineering aspects of acoustics. Review of oscillators, vibratory motion, the acoustics wave equation, reflection and transmission, and radiation and reception of acoustic waves. Resonators, hearing and speech, architectural and environmental acoustics.

434. Microelectromechanical Systems.
Static and quasistatic fields for micro-electromechanical transducers and certain microfluidic schemes. Capacitance models, lumped parameter electromechanics, and two-port device descriptions. Reciprocity and sensitivity issues.

435. Introduction to Optoelectronics.
Introduction to fundamentals of wave propagation in materials, waveguides and fibers, generation, modulation and detection of light using semiconductor devices, and elements of optoelectronic communication systems.

Random signals and noise in linear systems. Selected topics in probability theory, random variables, random vectors, random sequences (random walk, Martingales, ARMA model, Markov chains), random processes (Poisson process, Gaussian process, Wiener process, Markov process), stationary and cyclostationary processes, random process inputs to linear systems, ergodicity, filtering, linear estimation, bandlimited and bandpass processes.

441. Detection and Estimation Theory.
Classical detection and estimation theory (binary hypothesis tests, M hypothesis, Bayes estimation, maximum likelihood estimation), minimum variance unbiased estimators, Cramer-Rao lower bound, best line at unbiased estimators, least squares estimation, applications to detection of signals in noise and estimation of signal parameters. The role of signal design in Radar, Sonar and wireless communications will be discussed.
**444. Digital Communications.**

Digital communication system elements. Digital transmission, binary and M-ary modulation schemes, demodulation and detection, coherent and incoherent demodulators, error performance. Channel capacity, mutual information, simple discrete channels and the AWGN channel. Basics of channel coding and error correction codes.

**445. Wireless Communications.**

Concepts behind traditional cellular radio and wireless data networks (e.g., channel coding, medium-access) as well as design trade-offs among RF bandwidth, transmitter and receiver power and cost, and system performance.

**446. Digital Signal Processing.**

Analysis and design of discrete-time signals and systems, including: difference equations, discrete-time filtering, z-transforms, A/D and D/A conversions, multi-rate signal processing, FIR and IIR filter design, the Discrete Fourier Transform (DFT), circular convolution, Fast Fourier Transform (FFT) algorithms, windowing, and classical spectral analysis.

**447. Digital Image Processing.**


**450. Information Theory.**

Entropy, Relative Entropy, mutual information, asymptotic equipartition property, data compression, channel capacity, joint source channel coding theorem, Gaussian channels, rate distortion theory, selected applications.

**452. Medical Imaging-Theory and Implementation.**

Physics and implementation of X-ray, ultrasonic, and MR imaging systems. Fourier transform relations and reconstruction algorithms of X-ray and ultrasonic-computed tomography, and MRI.

**461. Introduction to VLSI.**


**462. Advanced CMOS/VLSI Design.**

Review of CMOS Subsystem design. Project design requirements include architectural design, logic and timing verification, layout design, and test pattern generation. The resulting VLSI chips may be fabricated.

**463. VLSI Error Control Systems.**

Reliability challenges introduced by the multi-core gigascale integration era, and discusses circuit, architectural, and algorithm level solutions to address them.

**464. Fundamentals of VLSI Testing.**

**465. Performance Issues VLSI/IC Design and Analysis.**

High performance digital and analog VLSI design and analysis. CMOS design techniques, speed/area/power tradeoffs in CMOS circuits, low power design, RLC interconnect, synchronization and clock distribution, pipelining/retiming.

**466. RF and Microwave-Integrated Circuits.**

Analysis and design of radio-frequency (RF) and microwave integrated circuits at the transistor level. Smith chart, s-parameters, and EM simulation. High-frequency narrow-band amplifiers, wideband amplifiers, low-noise amplifiers (LNA). Nonlinear circuits, oscillators and phase noise, phase-locked loops (PLL) and frequency synthesizers.

**467. Analog Integrated Circuit.**


**468. Advanced Analog CMOS Integrated Circuit Design II.**


**469. High-Speed Integrated Electronics.**

Integrated electronics in high speed and wideband applications, which spans the fields of wireless communications, computing, fiber optics, and instrumentation. High speed semiconductor technologies (CMOS, SiGe, SOI, GaAs, InP, etc) and devices (MOSFET, MESFET, HEMT, HBT, and tunneling diodes), design of high speed phase locked and delay-locked loops (PLL and DLL). VCO, frequency divider, phase detector, and loop filter.

**471. Computational Music.**

Fundamentals of computational music including selected topics in modern music theory and music representation, encoding of
music information by computers, musical sound representation and compression, automated music transcription, human-computer music interfaces and music informatics.

Acoustics and Digital Signal Processing techniques applied to the analysis and synthesis of musical sound. Sampling, quantization and audio quality metrics, time-frequency analysis and sound representations, audio filter design and implementation, musical sound synthesis techniques including spectral-based synthesis and physical modeling.

Introduction to the scientific foundations of nanoscience and the materials science that makes it possible, and to focus on developments in three major domains of applications, electronics, photonics, and biosensing.


589. Academic, Industrial, and Governmental Careers.
The course will feature multiple guest speakers from industry, government laboratories and academia (from different engineering and science departments). The goal of this short course is to prepare PhD students in engineering and the sciences for careers in academia, industry or government laboratories.

590. Energy for Twenty-First Century.
A succinct, yet complete and critical introduction to the different means of producing energy.

Mechanical Engineering

Riccardo Betti, PhD (MIT)
Professor of Mechanical Engineering, of Physics, and Senior Scientist in the Laboratory for Laser Energetics

Stephen J. Burns, PhD (Cornell)
Professor of Mechanical Engineering and of Materials Science

Robert Clark, PhD (Virginia Tech)
Professor of Mechanical Engineering; Dean, Edmund A. Hajim School of Engineering and Applied Sciences

Jonathan Ellis, PhD (Delft University, Netherlands)
Professor of Mechanical Engineering and of Optics

Paul D. Funkenbusch, PhD (Michigan Tech)
Professor of Mechanical Engineering and of Materials Science

Roger F. Gans, PhD (California, Los Angeles)
Professor of Mechanical Engineering

Victor L. Genberg, PhD (Case Western Reserve)
Professor of Mechanical Engineering

Sheryl M. Gracewski, PhD (California, Berkeley)
Professor of Mechanical Engineering and of Biomedical Engineering

John Lambropoulos, Ph.D (Harvard)
Professor of Mechanical Engineering, of Materials Science, and Senior Scientist in the Laboratory for Laser Energetics; Director, Materials Science Program

James C. M. Li, PhD (Washington)
Albert Arendt Hopeman Professor of Mechanical Engineering and Professor of Materials Science

Robert L. McCrory, PhD (MIT)
Professor of Mechanical Engineering, of Physics and Astronomy, and Senior Scientist in the Laboratory for Laser Energetics; Vice Provost, University of Rochester; Director and CEO of the Laboratory for Laser Energetics

David D. Meyerhofer, PhD (Princeton)
Professor of Mechanical Engineering, of Physics, and Senior Scientist in the Laboratory for Laser Energetics; Director of the Experimental Division

Renato Perucchio, PhD (Cornell)
Professor of Mechanical Engineering and of Biomedical Engineering

David J. Quesnel, PhD (Northwestern)
Professor of Mechanical Engineering and of Materials Science

John H. Thomas, PhD (Purdue)
Professor of Mechanical and Aerospace Sciences and of Astronomy

Richard E. Waugh, PhD (Duke)
Professor of Biomedical Engineering, of Pharmacology and Physiology, of Biochemistry and Biophysics, and of Mechanical Engineering

Amy L. Lerner, PhD (Michigan)
Associate Professor of Biomedical Engineering, of Mechanical Engineering, and in the Center for Musculoskeletal Research

Ahmet Becene, PhD (Rochester)
Adjunct Assistant Professor of Mechanical Engineering

Valeri Goncharov, PhD (Rochester)
Adjunct Assistant Professor of Mechanical Engineering and Scientist in the Laboratory for Laser Energetics

Andrei Maximov, PhD (Lebedev, Russia)
Adjunct Assistant Professor of Mechanical Engineering and Scientist in the Laboratory for Laser Energetics
Mission of the Program in Mechanical Engineering

The mission of the bachelor of science program in mechanical engineering at the University of Rochester is to educate able, creative, responsible engineers capable of assuming leadership roles in their profession. The department offers a rigorous academic program designed to prepare students for engineering practice, graduate study, and a lifetime of continued learning. The curriculum is based on a firm foundation of basic science, applied mathematics, and engineering sciences; and includes significant experience in experimental work and in the analysis, design, and development of mechanical and thermal systems. The program aims to enhance the leadership and communication skills needed to excel in professional life and to promote an understanding of the broad social and economic impacts of engineering.

Goals of the Program in Mechanical Engineering

1. To produce competent mechanical engineers employed in a wide variety of technical areas in the local, national, or international engineering job markets.

2. To prepare graduates who realize the value of continuing their education with a view toward careers in industry, research, business, or academia.

3. To educate articulate engineers who can see their engineering work in a larger social-political context for today’s complex, global, international responsibilities.

Mechanical engineers are among the most versatile, flexible, and broadly based engineers in the profession. Students acquire knowledge in the fields of energy, material properties, fluid mechanics, solid mechanics, dynamics, laboratory technique, design methodology, and system analysis. Graduates apply their skills in jobs requiring engineering design, development, manufacturing, research, and resource management.

The University of Rochester has offered an undergraduate degree in mechanical engineering (ME) for over 100 years. This program provides effective preparation for students who enter industry immediately upon graduation as well as excellent background for graduate study in engineering and other fields.

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 undergraduates progress. Laboratory and design courses emphasize teamwork projects. Formal oral and written presentations are key elements of these projects. A required senior year sequence in design acts as a capstone course in this process.

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 studies in optics manufacturing, modeling crystal growth, and experiments on nonlinear dynamical systems.

BS in Mechanical Engineering

The BS 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
Electives
Our program has one required technical elective and one required natural science elective. The courses must be selected from approved lists, found on the department’s web page, covering many fields. There are also three free electives, 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 many fields. There are also three free electives, 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 many fields. There are also three free electives, 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 many fields. There are also three free electives, 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 many fields.

Distribution Requirements
In addition to the required primary writing course, students must take four courses in the humanities or social sciences. Three of these courses must constitute a cluster. The Accreditation Board for Engineering and Technology (ABET) specifies that distribution requirements meet certain conditions. The first condition is that the set of courses taken must exhibit some depth, and cannot all be at the introductory level. This condition is normally satisfied by a cluster. The second condition is that courses dealing only with routine skills or exercises of personal craft are not suitable distribution requirements.

Accreditation
Students are assisted by a faculty advisor in planning a program of study. In making specific course selections, students are 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.

Standard Four-Year Program *
Below is the standard four-year program for students who decide on a mechanical engineering major in their first year.

| First Year |  |
|------------|--|---|---|
| MTH 161† | MTH 162† |
| CHM 131/151 | PHY 121 |
| Technical elective† | CSC 160 |
| WRT 105 (Primary Writing) | Cluster Course |

| Second Year |  |
|-------------|--|---|---|
| MTH 165 or 165 | MTH 164 |
| PHY 122 | Natural Science |
| ME 120 | ME 123 |
| ME 110 | ME 226 |
| Cluster Course |  |

| Third Year |  |
|------------|--|---|---|
| ME 280 | Circuits |
| ME 225 | ME 241 |
| ME 121 | ME 223 |
| Cluster Course | Distribution Elective |

| Fourth Year |  |
|-------------|--|---|---|
| ME 204 | ME 205 |
| ME 242 | ME 213 |
| ME 251 | Free Elective |
| Free Elective | Free Elective |

Minor in Mechanical Engineering
A minor in mechanical engineering is available, to give the non-majors an opportunity to study some of the main ideas of modern engineering and acquire the skills necessary to implement them. The interested students should plan a focused program of study with any mechanical engineering faculty member.

The requirements for a minor in mechanical engineering are as follows:

- Students must attain passing grades in four ME courses at the 200 level or higher. The minimal acceptable GPA for these courses is 2.0.
- Students’ program of study must include at least one of the following courses: ME 204, 205, 241, 242, or 251.

1. The alternative sequence MTH 141, 142, 143 may be taken instead of 161, 162.
2. ME 104Q is strongly recommended.
In preparation for the upper-level mechanical engineering courses, students would normally take two of the introductory courses ME 120, 121, 123, or their equivalents.

**Upper-Level Writing Requirement**

Upper-level writing requirements are satisfied by the required writing components of the laboratory project and design courses, required of all majors.

**Courses of Instruction**

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

**104Q. The Engineering of Bridges.**

An introduction to the art of bridge building based on the study of the engineering and technological problems involved in the design, construction, and collapse of bridges from antiquity to the present time. The course includes several case studies of major historical bridges selected for their structural significance. Students learn how to calculate the forces acting on structural elements, how these forces depend on the bridge structural form, how the form itself is conditioned by the structural materials, and how forces are measured with electromechanical instrumentation. The study includes fundamental notions of mechanics, strength of materials, structural behavior, instrumentation failure analysis, and design optimization. Working on teams, students use constructive experimental models as well as computer-aided programs to design, build, instrument, and test realistic bridge projects. This is a self-contained course open to all Rochester undergraduates.

**106. Engineering in Antiquity.**

Prerequisite: none.

Application of engineering principles and technology to the design and performance of engineering structures from antiquity to the pre-industrial world. Engineering principles (transfer of forces, momentum, and energy), study of primary texts (in translation), and examination of existing structures/monuments. Primary texts include selections from Aristotle’s Mechanical Problems, Vitruvius’ Ten Books on Architecture, Leonardo’s Notebooks, Galileo’s Dialogues on Two New Sciences. Emphasis on engineering design of engineered structures from the Bronze Age to the 18th century. Topics: Evolution of engineered materials (metals, wood, stone, marble, concrete, composites) and limitations; Bronze Age fortifications; Structural design of Greek temples; Roman aqueducts, siphons, and vaults; Force, power and energy sources and transmission; Failure of materials; Lifting devices; Construction engineering; Columns, beams, vaults, trusses, frames; Instruments of warfare. Open to all undergraduates.

**110. Introduction to CAD and Drawing.**

This course covers engineering drawing, and modeling using the Computer Aided Design software Pro/ENGINEER. Topics include orthographic projections, solid modeling, assemblies, and dimensioning. Students will complete the course with a fundamental ability to create and understand solid modeling, and engineering drawings using state of the art PC CAD software. Lectures will make use of a computer projection screen as well as 30 individual computers.

**121. Engineering Mechanics II.**

Description: This course uses an engineering approach to the solution of dynamics problems with an emphasis on conceptual understanding. Topics include kinematics and kinetics of particles and rigid bodies.

**123. Thermodynamics.**

Course Content: thermodynamic systems, properties, equilibrium, and processes; energy and the first law; properties of simple compressible substances; control volume analysis; steady and transient states; entropy and the second law, general thermodynamic relations.

**201. Applied Boundary Value Problems.**

This course covers the classical partial differential equations of mathematical physics: the heat equation, the Laplace equation, and the wave equation. The primary technique covered in the course is separation of variables, which leads to solutions in the form of eigenfunction expansions. The topics include Fourier series, separation of variables, Sturm-Liouville theory, unbounded domains and the Fourier transform, spherical coordinates and Legendre’s equation, cylindrical coordinates and Bessel’s equation. The software package Mathematica will be used extensively. Prior knowledge of Mathematica is helpful but not essential. In the last two weeks of the course, there will be a project on an assigned topic. The course will include applications in heat conduction, electrostatics, fluid flow, and acoustics.

**202. Introduction to Applied Complex Variables.**

Complex numbers and the complex plane; analytic functions; elementary functions; complex integration; series expansions; residue theory; multi-valued functions; conformal mapping. Applications: use of complex functions in oscillation theory; solution of Laplace’s equation; evaluation of definite integrals by contour integration; series solutions of ordinary differential equations.

**204. Mechanical Design.**

Description: The theory and application of structural mechanics to mechanical design. Topics include: matrix structural analysis and finite element techniques. Students will 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.

**205. Advanced Mechanical Design.**

This is an applied course that teaches the student how to use engineering principles in the design of mechanical components and mechanical systems. Topics include: load determination,
static and fatigue failure theories, design and analysis of machine components (e.g. shafts, gears, bearings, fasteners, etc.), and the mechanical design process. The student learns the mechanical design process through team based design activities. In particular, project teams will design, analyze, build, and test a working machine in a semester long project. Formal design reviews and engineering reports will be used to document results.

206. Building Engineering and Technology in Antiquity.
Engineering and technological problems involved in the design, construction, maintenance, and collapse of major buildings and infrastructural systems from antiquity to the pre-industrial world drawing material from case studies of relevant monuments primarily from Classical Rome and Greece, and the Middle Ages.

211. Computational Methods.
Introduction to Matlab; solution of linear equations; interpolation; numerical differentiation and integration; root finding; data fitting; numerical solution of ordinary differential equations.

213. Mechanical Systems.

222. Introduction to Robust Design and Quality Engineering.
Definition and pursuit of “quality” as a design criterion. The concept of robust design. Selection of the quality characteristic, incorporation of noise, and experimental design to improve robustness. Analysis and interpretation of results.

223. Heat Transfer.
Review of thermodynamic concepts; energy balances; heat transfer mechanisms. Steady-state heat conduction; concept of thermal resistance; conduction in walls, cylinders, and spheres; cooling fins. Transient heat conduction; lumped parameter systems; transient conduction in plane walls; transient conduction in semi-infinite solids. Numerical analysis of conduction; finite difference analysis; one-dimensional steady conduction; two-dimensional steady conduction; transient conduction. Fundamentals of convection; fluid flow and heat transfer; energy equation; convective heat transfer from flat plate; use of dimensional analysis. External forced convection; flow over flat plates; flow past cylinders and spheres; flow across tube banks. Internal forced convection; thermal analysis of flow in tubes; laminar flow in tubes; turbulent flow in tubes. Heat exchangers; overall heat transfer coefficient; log mean temperature analysis; effectiveness-NTU method.

225. Introduction to Fluid Dynamics.
Fluid properties; fluid statics; kinematics of moving fluids; the Bernoulli equation and applications; control volume analysis; differential analysis of fluid flow; inviscid flow, plane potential flow; viscous flow, the Navier-Stokes equation; dimensional analysis, similitude; empirical analysis of pipe flows; flow over immersed bodies, boundary layers, lift and drag.

226. Introduction to Solid Mechanics.

241. Fluids Lab.
Introductory Lecture(s) on lab practice and data analysis. The lab itself consists of two parts: The first part uses simple experiments to familiarize the student with computer data acquisitions and some basic instrumentation. In the second part, students (working in groups of three) perform independent experimental projects. The course has significant writing content and makes formal use of the Writing Center. In addition to written and oral laboratory reports, each group is expected to make a final poster presentation of its work.

Lecture and laboratory. Lecture: engineering problem solving methodologies and review of basic statistics (homework and a midterm). Laboratory: small (one week) laboratories dealing with solids/materials instrumentation (completion of several required), and an independent project (including a written proposal, a proposal presentation, experimentation with equipment building and testing, 3 update presentations, a final presentation, a final report and a poster presentation). Most students will work in groups of three during much of the class. Graduate students work alone on independent projects.

Vapor power systems, gas power systems, refrigeration and heat pumps, internal combustion engines, compressors and turbines.

253. Introduction to Nuclear Engineering.
A first course in nuclear engineering with emphasis on the fundamental physics and technology of modern water-cooled power reactors, the nuclear fuel cycle, and the regulatory environment surrounding nuclear power in the United States.

254. Finite Elements.
This course provides a thorough grounding on the theory and application of linear finite element analysis in solid mechanics and related disciplines. Topics: structural matrix analysis concepts and computational procedures; shape functions and element formulation methods for 1-D, 2-D problems; variational methods, weighted residual methods and Galerkin techniques; isoparametric elements; error estimation and convergence; global analysis aspects. Term project and homework require computer implementation of 1-D and 2-D finite element procedures using Matlab. Term project not required for ME254.
280. Introduction to Materials Science.
Properties of engineering materials including metals, alloys, ceramics, polymers and composites. Relationship of properties to the materials microstructure including atomic bonding, atomic arrangement, crystal structure, co-existing phases, interfaces, defects and impurities. Processing techniques for altering the microstructure and properties.

281. Mechanical Properties.
The mechanical response of crystalline and amorphous solids and their composites in terms of the relationships between stress, strain, damage, fracture, strain-rate, temperature, and microstructure. Topics include: (1) Material structure and property overview. (2) Isotropic and anisotropic elasticity and viscoelasticity. (3) Properties of composites. (4) Plasticity. (5) Point and line defects. (6) Interfacial and volumetric defects. (7) Yield surfaces and flow rules in plasticity of polycrystals and single crystals. (8) Macro and micro aspects of fractures in metals, ceramics and polymers. (9) Creep and superplasticity. (10) Deformation and fracture mechanism maps. (11) Fatigue damage and failure; fracture and failure in composites (if time permits).

390. Supervised Teaching.

391. Independent Teaching.

392. Special Topics.

393. Special Essay or Thesis.

394. Internship.

395. Independent Research.

GRADUATE COURSES

The following graduate courses are open to advanced undergraduates with permission of the instructor.

Mathematical methods for obtaining approximate analytical solutions to differential equations that cannot be solved exactly. Particular attention will be given to the following methods: Boundary Layer Theory, WKB Theory, Multiple-Scale Analysis, Asymptotic Expansion of Integrals (method of stationary phase, method of steepest descents), Renormalization group.

Formulation of a typical problem; review of Sturm-Liouville theory. Occurrence of Laplace and Poisson equations; Greens functions; solutions in rectangular, cylindrical, and spherical coordinates. Occurrence of diffusion equation; Greens functions; scale relations in diffusion; vector fields and spherical decay modes; diffusion in moving materials; Burgers equation; Fishers equation. First order equations and the theory of characteristics; examples of kinematical waves. Wave equation and propagation; use of characteristics with wave equation; Helmholtz equation; combination of propagation and diffusion. Dispersive waves; dispersion relations; Fourier integral and stationary phase; group velocity and wave trains; Kramers-Kronig relations. Boundary layers and multiple scales; matched asymptotic expansions.

Computational methods to solve analytically intractable mathematical problems in biological research. Using matlab as a programming language; Numerical methods for linear algebra, ODE and PDE; Case studies such as biodynamics of human locomotion, ion channel kinetics, ionic diffusion in cells and finite element analysis of cells/tissues.

406. Dynamical Systems.
Plane autonomous systems: phase plane, stability of equilibrium by linearization; stability by Liapunov methods; periodic solutions and their stability; global phase portraits; bifurcations. Higher order autonomous systems: matrix methods for linear systems; local behavior near equilibrium points; Lorenz equations and chaotic solutions; tent map and Lorenz equations; Liapunov exponents. Driven systems: Duffing’s equation; the driven pendulum.

407. Advanced Dynamics.

408. Phase Transformation.
How and why atomic rearrangements leading to phase transformations occur and how they are associated with kinetic and crystallographic features; liquid-solid and solid-solid transformations, nucleation theory, growth, massive and martensitic transformations.

424. Introduction Robust Design and Quality Engineering.
Definition and pursuit of “quality” as a design criterion. The concept of robust design. Selection of the quality characteristic, incorporation of noise, and experimental design to improve robustness. Analysis and interpretation of results.

434. Introduction to Plasma Physics I.
Basic plasma parameters; quasi-neutrality, Debye length, plasma frequency, plasma parameter, Charged particle motion: orbit theory. Basic plasma equations; derivation of fluid equations from the Vlasov equation. Waves in plasmas. MHD theory.
435. Introduction to Plasma Physics II.
Vlasov equation, Landau damping, VanKampen modes, two-stream instability, micro-instabilities, introduction to kinetic theory, shield clouds, Thomson scattering, and the Fokker-Planck equation.

Kinematics, equations of motion; thermodynamics of gases; linear acoustics; Bernoulli equation; potential flow; steady one-dimensional flow; shock waves, normal and oblique shocks; unsteady one-dimensional flow, characteristics. Applications in engineering and astrophysics.

437. Incompressible Flow.
Kinematics, the Navier-Stokes equation, the stream function, vorticity dynamics, laminar viscous flows, slow viscous flow, boundary layers, inviscid irrotational flow.

Application of direct and indirect methods of the calculus of variations to the stress, deflection, and dynamic analysis of beam, ring and plate elements. Stress energy and complementary strain energy; variational principles; Lagrange multipliers, Rayleigh-Ritz method; Galerkin Method.

441. Finite Elements.
This course provides a thorough grounding on the theory and application of linear finite element analysis in solid mechanics and related disciplines. Topics: structural matrix analysis concepts and computational procedures; shape functions and element formulation methods for 1-D, 2-D problems; variational methods, weighted residual methods and Galerkin techniques; isoparametric elements; error estimation and convergence; global analysis aspects. Term project and homework require computer implementation of 1-D and 2-D finite element procedures using Matlab. Term project not required for ME254.

443. Applied Vibration Analysis.
One, two and many degrees-of-freedom systems. Complex representation; free and forced vibration; transient vibration; damping. Vibration of strings, beams and membranes.

444. Continuum Mechanics.

449. Elasticity.
Analysis of stress and strain; equilibrium; compatibility; elastic stress-strain relations; material symmetries. Torsion and bending of bars. Plane stress and plane strain; stress functions. Applications to half-plane and half-space problems; wedges; notches. 3-D problems via potentials.

Crystallography, symmetry elements, space groups, x-ray diffraction from single crystals and powder patterns. Fourier transforms, grain size effects, residual stresses and textures, diffuse and small angle scattering, Bragg and Laue x-ray diffraction topography, thin films and epitaxial layers. Modern x-ray software for diffraction analysis including textures, residual stresses, pattern identification and Rietveld applications.

The theory and application of nonlinear finite element analysis in solid mechanics. Topics: generalization of FE concepts, review of solid mechanics, nonlinear incremental analysis, displacement based FE formulation for large displacements and large strains, nonlinear constitutive relations, incompressibility and contact conditions, rubberlike materials, biomechanical materials, inelastic material.

460. Thermodynamics of Solids.
Review of basic thermodynamic quantities and laws; equations of state; statistical mechanics; heat capacity; relations between physical properties; Jacobian algebra; phase transformations, phase diagrams and chemical reactions; partial molal and excess quantities, phases of variable composition; free energy of binary and multicomponent systems; surfaces and interfaces. The emphasis is on the physical and chemical properties of solids including stress and strain variables.

461. Fracture and Fatigue.
Stress fields near cracks in linear elasticity. Linear elastic fracture mechanics. Griffith fracture theory. K and J approaches to fracture. Failure analysis and fracture stability; crack tip deformation, crack tip shielding. Crack nucleation. Adhesion. Low cycle fatigue. Fatigue crack propagation. Emphasis on the role of microstructure in determining fracture, adhesion and fatigue behavior of materials; improving fracture toughness for advanced materials especially ceramics and polymers. This course is taught at a level that brings the student to the level of current research.

Lecture and laboratory. Lecture: engineering problem solving methodologies and review of basic statistics. Laboratory: dealing with solids/materials instrumentation Students work in groups of three. Graduate students work alone on independent projects.

463. Microstructures.
481. Mechanical Properties.

The mechanical response of crystalline (metals, ceramics, semiconductors) and amorphous solids (glasses, polymers) and their composites in terms of the relationships between stress, strain, damage, fracture, strain-rate, temperature, and microstructure.
including fiber-optic communications, holography, laser surgery, digital cameras, handheld displays, virtual reality environments, quantum cryptography, and energy-efficient lighting. Today, optics has become one of the technological pillars of modern society. Optical techniques also contribute much to modern science, figuring prominently in a number of recent Nobel Prizes.

Rochester students completing the BS in optics in recent years have chosen to pursue graduate studies in optics, physics, electrical engineering, and biomedical engineering; to accept positions as optical engineers in the thriving optics industry; to work in engineering sales; and to enter business programs to pursue an MBA. In addition to traditional career directions, medicine and law offer significant opportunities for someone with a background in optics. Optical instrumentation and techniques are increasingly important in medical research and medical practice, so an MD or an MD/PhD with a BS in optics is uniquely educated to become a key participant in these emerging areas. Likewise, because of the strong entrepreneurial spirit of the optics community, a patent attorney with a BS in optics can establish a very active practice.

The optics/optical engineering curriculum (BS degrees are offered in both) provides the depth and breadth needed to prepare for a variety of career options. The foundations of optics are covered by the required coursework, including classes in lasers, geometrical and physical optics, electromagnetic theory, quantum mechanics, and optical and optoelectronic devices, instruments, and measurement techniques. Majors can supplement their required coursework with a number of electives to tailor their programs to their specific interests. Optics BS recipients complete a yearlong, mentored research project; optical engineering BS recipients engage in a team-based optical design project including a customer and a faculty advisor. The newly formed Hopkins Center for Optics Design and Engineering, located within the department and intended expressly for undergraduates, houses state-of-the-art tools for the design, fabrication, and testing of optical elements, giving students unusually direct access to cutting-edge technology. Many students also get involved as underclassmen in the world-class faculty research programs that are a distinctive part of the institute’s culture.

The Institute of Optics has a formal study-abroad relationship with the University of New South Wales in Australia enabling several optics majors per year to spend a semester overseas.

Admission Requirements
Students normally apply for admission to the Institute of Optics at the end of the sophomore year by submitting a major approval form to their advisor or to the chair 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, and 123, or 141, 142, 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 or 165, and 164, or in those courses taken to fulfill the math requirement
4. a grade of “C” or better in each of OPT 241 and 261
5. completion of WRT 105 with a grade of “C” or better

For graduation, a minimum cumulative grade 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, students must have at least 130 credit hours completed for either degree.

The faculty of the Institute of Optics recognize achievement among our graduates by noting those who graduate with distinction based upon their average grades in their core optics courses. In particular, students who have a GPA of 3.85 or higher in the core OPT courses receive their degrees with Highest Distinction; those with GPAs between 3.60 and 3.84 are noted to have achieved High Distinction; and those who have GPAs between 3.25 and 3.59 receive Distinction.

BS in Optics or BS in Optical Engineering
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

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<td>MTH 161</td>
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<td>CHM 131 or PHY 141</td>
<td>PHY 121</td>
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<tr>
<td>WRT 105</td>
<td>Cluster or WRT 105 (if closed out in fall semester)</td>
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<td>EAS Course</td>
<td>CSC 160</td>
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<tr>
<td>MTH 164</td>
<td>MTH 163 or 165</td>
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<tr>
<td>PHY 122 or 142</td>
<td>PHY 123 or 143</td>
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<td>OPT 241/OPT 197</td>
<td>OPT 261/OPT 198</td>
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<td>Cluster or elective course</td>
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<td>OPT 242/OPT 199</td>
<td>OPT 262</td>
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<td>OPT 244</td>
<td>OPT 287</td>
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<tr>
<td>MTH 281</td>
<td>ECE 210</td>
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<td>Technical or cluster course</td>
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<tr>
<td>OPT 223</td>
<td>Technical/cluster/elective course</td>
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<td>OPT 256</td>
<td>OPT 226</td>
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<tr>
<td>OPT 310* or OPT 320* (2 cr.)</td>
<td>OPT 311* or OPT 321*</td>
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<tr>
<td>Technical/cluster/elective course</td>
<td>Technical/cluster/elective course</td>
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Outstanding students are encouraged to take the physics sequence recommended for physics majors—PHY 141, 142, 143.

There is an electronic circuits requirement which may be satisfied by ECE 210, and a computing requirement which may be satisfied by CSC 160 or comparable course. Individual circumstances may vary.

Mastery of prerequisite courses is essential to ensure successful performance in subsequent courses. For cases in which students have 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 students are 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
In accordance with the Rochester Curriculum, students must complete one cluster from the humanities division or one cluster from the social sciences division plus one course from the remaining division (“one cluster plus one course”). Minors in these areas also satisfy this requirement.

Technical Electives
Two technical electives at the 200 level are required. These courses in combination with one course from the major should provide a deeper mastery or skill level of a particular area of optics. Students consult their faculty advisor to select appropriate courses in optics, other engineering or science disciplines, or math.

Minor in Optics
Students interested in completing a minor in optics should meet with a faculty member of the Institute of Optics to plan a focused program of study. Optical sciences and technologies have great importance in a range of fields and applications, and a stronger grasp of the field is a desirable option, particularly for majors in other science and engineering disciplines.

The requirements for a minor in optics are satisfied by earning grades of “C” or better in five optics courses, one of which must be laboratory-based. Two courses are required: OPT 241 and 261. The lab component may be satisfied by OPT 197, 198, 199, or 256, or by independent research for credit. The remaining two courses can be chosen among those offered by the institute at the 200 level or above.

Students interested in the optics minor should note that most 200-level optics classes have prerequisites in math and/or physics that must also be satisfied, unless permission of the instructor is obtained.

Upper-Level Writing Requirement
OPT 261 (with OPT 198), and OPT 256 fulfill the upper-level writing requirements.

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1. An alternative approved sequence is MTH 171, 172, 173, 174 for those considered eligible by the Department of Mathematics or MTH 141, 142, 143, 145, or 163, 164.
2. OPT 261 with OPT 198, and 256 fulfill the upper-level writing requirement.
3. OPT 310 and 311 are required for the BS in optical engineering.
4. OPT 320 and 321 are required for the BS in optics.
BS-MS Program in Optics

The 3-2 program allows undergraduate students to complete both a bachelor’s degree in optics or optical engineering and a master’s degree in optics in an integrated five-year program of study. (It should be noted that optics offers a standalone one-year MS degree in optics. As such, the 3-2 program is not a mechanism for saving time in completing the two degrees, in contrast to some other departments and at other schools.) The 3-2 program assumes the completion of all undergraduate bachelor’s requirements and some of the graduate requirements in the first four years. The fifth year is devoted solely to graduate courses.

General Information

1. Students with significant AP or transfer credit who wish to do research or desire a MS degree in optics should definitely consider the 3-2 program.
2. Students planning on the 3-2 program should get faculty advice on course scheduling prior to junior year, to facilitate proper course selection.
3. Aspiring 3-2 students must find an optics faculty MS advisor before applying. The MS advisor advises the students regarding graduate coursework. The 3-2 application must contain a specific proposal for MS essay or thesis, agreed to by the advisor. The faculty advisor helps design the strategy for and specifics of the students’ program of study. (A program of study form must be submitted to the College before the first term of graduate matriculation, usually in the fourth year).
4. Aspiring 3-2 students are strongly encouraged to take one or more 400-level courses as part of their undergraduate degree coursework. Students should not take both the 200 and 400 level versions of any course in the BS/MS program.
5. 3-2 students must finish all undergraduate requirements by the end of the fourth year at which point they will receive the bachelor’s degree.
6. Applying to the 3-2 program: Read over the Information for Prospective Graduate Students: www.optics.rochester.edu/academic_programs/requirements.html and apply through the link on that page, with these differences:
   a. GREs are not required for qualifying GEAR students
   b. of the minimum three letters of recommendation, one may be from the MS advisor
   c. the application should be submitted by February 1 of the junior year

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

101. Introduction to Optics.
A discussion of the properties of light: refraction, imaging, diffraction, interference, the development of the microscope, telescope, laser, the Internet, information storage and display, and medical applications. Demonstrations.

197. Geometrical Optics Lab.
Students examine, analyze, measure, dismantle and reverse-engineer a variety of new and used optical tools, apparatus and systems. Emphasis on conceptual understanding and intuitive problem-solving.

198. Physical Optics Lab.
This lab complements OPT 261. Experiments cover interference and diffraction phenomena, introduction to optical information processing and electronic imaging systems with emphasis on error analysis.

199. Instrumentation Lab.
This laboratory complements OPT 242. Students experience further optical phenomena in the lab setting to better understand equipment that provides measurement and key optical data.

211. Computational Methods in Optics.
Teaches techniques of transforming continuous problems to discrete mathematical models. Students learn computational methods for solving problems in optics using high level software. Includes labs.

223. Quantum Theory of Optics.
Intro to quantum mechanics in the context of modern optics and optical technology. Wave mechanics as applied to electrons in crystals and in quantum wells and the optical properties of materials. Semiconductor junctions in photodetectors and photoemitters.

Fundamentals and applications of laser systems, including optical amplification, cavity design, beam propagation and modulation.

226. Optoelectronics I.
Light propagation in restricted geometries including waveguides and optical fibers. Dispersion and loss in linear and nonlinear pulse propagation. Coupling between passive and between active and passive elements.

232. Optomechanics.
System performance of glass with metal or plastic, kinematic design, material limitations. Applications to optical metrology, alignment, geometry 2D and 3D. This course is an OPT elective.
241. Geometrical Optics.
Optical instruments and their uses. First-order Gaussian optics and thin-lens system layout. Photometric theory applied to optical systems. The eye, magnifier, microscope, matrix optics, nature of Seidel aberrations.


Fabrication of a plane parallel plate, lens, or prism from a variety of optical glasses: controlled loose abrasive grinding pitch polishing skills; optical metrology, including interferometry and evaluation of roughness.

246. Optical Coating Technology.
Optical interference in a multilayer stack and its application to anti-reflection coatings, beamsplitters, laser mirrors, polarizers, and bandpass filters.

253. Quantum Optics Laboratory.
Teaching lab to learn techniques of photon counting and methodology that explains the uses of entanglement, Bell's inequalities, single-photon interference, and the potential for business applications.

256. Optics Laboratory.
Students rely on previous learning to create, align, collect data, solve and report on a variety of optical experiments.

261. Interference and Diffraction.
Complex representation of waves; scalar diffraction theory; Fresnel and Fraunhofer diffraction and application to measurement; diffraction and image formation; optical transfer function; coherent optical systems, optical data processing, and holography.

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.

275. Biomedical Optics.
Biomedical spectroscopy (absorption, fluorescence, Raman, elastic scattering); propagation of photons in highly scattering media (such as tissue); techniques for high-resolution imaging in biological media: confocal imaging, multiphoton imaging and optical coherence tomography. Taught every other fall.

281. Mathematical Methods for Optics and Physics.
Techniques used in mathematical study of optical phenomena. Emphasis on gaining insight and experience in the use of these powerful and elegant tools for describing, solving and resolving optical systems and schema.

287. SEM Practicum.
Overview of techniques for using the SEM (Scanning Electron Microscope) and Scanning Probe (AFM, STM) and analyzing data. Students perform independent lab projects by semester’s end.

307. SEM Practicum.
Overview of techniques for using the SEM (Scanning Electron Microscope) and Scanning Probe (AFM, STM) and analyzing data. Students perform independent lab projects by semester’s end.

310. Senior Design I.
Specifications, project development, and project planning will include design alternatives and subsystem segmentation discussions.

311. Optics Senior Design Project.
Documenting each stage, student teams design, build, and test an optical device or instrument for a faculty, community or industrial sponsor.

320. Senior Thesis I.

321. Senior Theses II.

391. Independent Reading.

395. Undergraduate Research Project.

GRADUATE COURSES

The following graduate courses are open to advanced undergraduates with permission of the instructor.

407. SEM Practicum.
Overview of techniques for using the SEM (Scanning Electron Microscope) and Scanning Probe (AFM, STM) and analyzing data. Students perform independent lab projects commensurate with their graduate research.

411. Mathematical Methods for Optics and Physics.
Advanced techniques utilizing vector calculus, series expansions, contour integration, integral transforms (Fourier, Laplace and Hilbert) asymptotic estimates, and second order differential equations.

417. Quantum Mechanics for Optics.
Quantum theory topics relevant to atomic physics, radiation theory and quantum optics.

Optical properties of electrons, phonons, plasmons, and polaritons in semiconductors, metals and insulators are detailed.
Fundamentals and applications of laser systems, including optical amplification, cavity design, beam propagation and modulation. (For non-Optics/Physics graduate students)

425. Radiation and Detectors.
The course covers thermal radiation, radiometry, photometry, colorimetry, and surveys several types of detectors.

Covers analog and digital signals, multiplexing techniques, modulation formats, dispersive and nonlinear properties in optical fibers, LED’s and semiconductor lasers, optical amplifiers and dispersion management with several systems.

441. Geometrical Optics.
Factors and methods for solving problems posed by various image-forming optical systems.

442. Instrumental Optics.
Principles and practices for solving problems of optical imaging, optical instruments and optical systems.

443. Optical Fabrication and Testing.
Characteristics and properties of optical glass and the methods for fabricating high quality surfaces and components. Lectures will describe applications of such glass in laser systems and nonlinear optics. Enrollment limited to 12 students.

444. Lens Design.
3rd order aberration theory, optimization theory, global optimization, variables and constraints of various lens materials and types. Course concludes with individual lens design projects.

446. Optical Interference Coating.
Optical interference in a multilayer stack and its application to anti-reflection coatings, beamsplitters, laser mirrors, polarizers, and bandpass filters.

447. Advanced Optical Coatings.
Specialty and custom coatings and their scientific applications and business uses.

448. Vision and the Eye.
How the human eye’s optical and neural factors process color and spatial information includes comparison with the design and capabilities of other animals’ eyes.

461. Physical Optics.
Diffraction and propagation based on Fourier transform theory; integral formulation of electromagnetic propagation; imaging and transforming, optical transfer function and more.

462. Physical Optics II.
Electromagnetic theory as a foundation for classical descriptions of many optical phenomena. Pertaining topics reviewed and expanded upon.

Examination of theory of strongly focused light, confocal and nearfield optical microscopy, atomic decay rates in inhomogeneous environments, single molecule spectroscopy, and optical forces.

Topics include quantum mechanical treatments to two-level atomic systems, optical gain, homogeneous and inhomogeneous broadening, laser resonators, cavity design, pumping schemes, rate equations, Q-switching for various lasers.

467. Non-Linear Optics.
Fundamentals and applications of optical systems based on the nonlinear interaction of light with matter. Topics include mechanisms of optical nonlinearity, and selection criteria of nonlinear optical materials.

468. Waveguides and Optoelectronic Devices.
Propagation and interactions in optical waveguides. Topics include the Goos-Haenchen effect, coupled-mode theory, pulse broadening in optical fibers, coupling between guided-wave structures and wave-guide devices such as semiconductor lasers, fiber lasers and optoelectric devices.

*491. Master’s Reading in Optics.

492. Special Topics in Optics.

*495. Master’s Research in Optics.

* Admission is normally limited to those students enrolled in the five-year optics BS-MS program.
Interdisciplinary Programs

Geomechanics

PROGRAM ADVISORS
Roger F. Gans, PhD (California, Los Angeles)*
Professor of Mechanical Engineering

John A. Tarduno, PhD (Stanford)
Professor of Geophysics and of Physics

The program in geomechanics is a joint offering of the Department of Earth and Environmental Sciences and the Department of Mechanical Engineering and leads to the degree of bachelor of science in geomechanics. The program provides an unusual opportunity for students interested in the quantitative aspects of the earth sciences.

The curriculum emphasizes the application of the principles of mechanics to problems associated with the atmosphere, the oceans, and the solid earth. The program is a natural blend between the two departments and builds on several areas common to engineering and to quantitative earth sciences: the mechanics of fluids, the mechanics of solids, and the properties of materials.

Students who successfully complete this program become well equipped for employment or graduate studies in a number of fields, such as civil and other engineering disciplines, geology and geophysics, hydrology, engineering geology, and other related fields. Career opportunities include work with the U.S. Geological Survey and with departments of natural resources or environmental protection at the federal, state, and county levels; with the oil and mineral resources industries; and in multidisciplinary private consulting firms engaged in geological engineering.

The geomechanics degree is awarded by the College in either arts and sciences or engineering and applied sciences—the choice is made by the students. If the students choose arts and sciences, their major advisor is in the Department of Earth and Environmental Sciences; if the degree is to be granted through mechanical engineering, the requirements are ME 120, 123, 223, 225, 256, and either 241 or 242.

In addition to the above courses, there are four technical electives, which may be any of the earth and environmental sciences or mechanical engineering courses at the 200 level or higher and one technical elective from any discipline, as agreed upon with the faculty advisor.

For preparation in mathematics, the program requires MTH 161, 162, ME/MTH 163, and 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 131. In earth and environmental sciences, EES 101, 201, 204, and 208 are required; and in mechanical engineering, the requirements are ME 120, 123, 225, 256, and either 241 or 242.

BS in Geomechanics

The geomechanics curriculum is built around basic mathematics, physics, chemistry, earth and environmental sciences, and engineering courses. The required earth and environmental sciences courses cover geologic processes, the evolution of the earth, mineralogy, and structural geology. Required engineering courses deal with basic mechanics, thermodynamics, fluid mechanics, and solid mechanics.

Technical electives, chosen from a number of earth and environmental sciences and engineering offerings, include courses in geophysical fluid dynamics, optical mineralogy, advanced mechanics, heat transfer, rheology, rock mechanics, materials science, geophysics, sedimentary processes, and laboratory studies.

The program also allows three free electives, which students may choose to suit their special interests. For example, students 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 earth and environmental sciences 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. Students are encouraged to approach faculty regarding projects of interest.

The program includes three free electives to allow a strong minor in an area of particular interest to the students or to broaden the scope of the curriculum. Other general degree requirements, including distributive requirements, are those listed below.

Below is a sample arrangement of courses. Considerable variations on this ordering are possible to accommodate transfers and special needs.

Four-Year Program in Geomechanics

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<th>First Year</th>
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<tr>
<td>MTH 161†</td>
<td>MTH 162†</td>
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<tr>
<td>EES 101</td>
<td>PHY 121</td>
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<td>WRT 105 (Primary Writing)</td>
<td>ME 120</td>
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<td>Elective</td>
<td>Elective (cluster)</td>
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<tr>
<td>PHY 122, 181</td>
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<td>Elective (cluster)</td>
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<tr>
<td>Elective</td>
<td>EES 201</td>
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† An alternative approved sequence is MTH 171, 172 for those considered eligible by the Department of Mathematics. An acceptable alternative sequence to MTH 161.

1. One of these must be ME 241 or 242. Four of the remaining five are taken from earth and environmental sciences or mechanical engineering. The sixth may be any technical course approved by your faculty advisor.
### Third Year

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<tr>
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<td>ME 225</td>
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<td>Elective (technical) 1</td>
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<td>PHY 183</td>
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<td>Elective (cluster)</td>
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<td>Elective (cluster)</td>
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### Fourth Year

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<tr>
<td>Elective (cluster)</td>
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1. An alternative approved sequence is MTH 171, 172 for those considered eligible by the Department of Mathematics. An acceptable alternative sequence to MTH 161.

2. One of these must be ME 241 or 242. Four of the remaining five are taken from earth and environmental sciences or mechanical engineering. The sixth may be any technical course approved by your faculty advisor.

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### Interdepartmental Degree Programs

**PROGRAM COMMITTEE**

- **Thomas Y. Hsiang, PhD** (California, Berkeley)  
  Professor of Electrical and Computer Engineering; Associate Dean for Undergraduate Programs, Edmund A. Hajim School of Engineering and Applied Sciences

- **Robert C. Waag, PhD** (Cornell)  
  Arthur Gould Yates Professor of Engineering, Professor of Electrical and Computer Engineering and of Imaging Sciences

- **Chunlei Guo, PhD** (Connecticut)  
  Associate Professor of Optics

- **Mitchell Anthamatten, PhD** (MIT)  
  Associate Professor of Chemical Engineering and Scientist in the Laboratory for Laser Energetics

- **Kevin Davis, PhD** (Boston)  
  Associate Professor of Biomedical Engineering and of Neurobiology and Anatomy

- **Thaddeus E. Pawlicki, PhD** (SUNY, Buffalo)  
  Lecturer in Computer Science

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### Bachelor of Science in Engineering and Applied Science

The interdepartmental degree BS in engineering and applied science (BS/IDE) is intended for students who have specific technical objectives not adequately addressed by the other BS degree programs offered by the Edmund A. Hajim School of Engineering and Applied Sciences. For example, students with interests in patent law or in architectural engineering have crafted programs of study well suited to their specific educational objectives through the Interdepartmental Program.

Within the total of 32 courses (128 credit hours) required to earn the BS degree, a minimum of 18 are devoted to mathematics, other natural sciences, and engineering. Of these, at least eight must be courses offered by the Hajim School of Engineering and Applied Sciences. A minimum of nine additional courses are devoted to satisfying the primary writing requirement, upper-level writing requirement, and two clusters, one in humanities and one in the social sciences. The remaining courses may be free electives. Students frequently use these courses to pursue one of the many certificates offered by the University or a minor in one of the disciplines in the humanities or social sciences.

Each degree program under BS/IDE must include three sequences of technical or scientific courses. Each sequence must include at least three courses, only one of which may be at the 100 level. A sequence of courses is defined as “a logical progression of study, confined to an acceptably identifiable area, which later material builds upon and extends earlier material.” (In rare cases, the committee has approved the use of a nontechnical or nonscientific sequence to strengthen the focus of a program when students wish to study such a discipline in depth.)

A final degree requirement under BS/IDE is a senior thesis. The thesis is a coherent, written summary of independent study,
in the focus area of the program, undertaken under the supervision of an appropriate member of the engineering faculty during the students’ junior and senior years. Up to 8 credit hours of independent study may be included in the students’ program. During the second semester of the sophomore year, the prospective BS/IDE students are expected to seek out and work with an appropriate faculty member to define an area of independent study. A brief description of the topic, along with the supervising faculty member’s signature, is submitted by the end of the sophomore year as part of the application for admission to BS/IDE.

Students are expected to enter with and to maintain strong academic records. All students in the program must earn a minimum cumulative grade point average of 2.0 for all courses taken in their fields of specialization. This includes all courses in their sequences as well as the eight required engineering courses. In addition, students entering the program must have completed the following subjects with a grade point average of at least 2.7: primary writing, one course; mathematics, three courses, including one in differential equations (usually MTH 163); chemistry and physics, four courses, at least one in each. Full details of both admissions and degree requirements under BS/IDE are provided in documents available from the Dean’s Office in 301 Lattimore Hall.

Students who are attracted to engineering and who are either unsure of specialization within the field or who have specific interests not obviously addressed by the standard programs are strongly encouraged to contact the Dean’s Office in 301 Lattimore Hall for information on guidelines and degree requirements.

Bachelor of Arts in Engineering Science

The BA in engineering science (BA/ES) is intended for students who, while not necessarily planning careers in the practice of engineering, may benefit from an enhanced technical content in their education. Technology and corresponding modes of thought are becoming ever more important in issues affecting everyone. Examples include environmental issues, such as acid rain and the greenhouse effect; issues broadly related to medicine, such as gene splicing and the proper use of life support systems; legal issues, such as privacy of records in the computer age; and new regulative and ethical issues raised by developing technology.

The BA in engineering science emphasizes breadth across engineering disciplines and as such offers an exposure to technology not available via other degree programs. Thus, students considering careers in business, law, or medicine may find the BA program excellent preparation. The technological focus of the program may offer advantages in dealing with issues such as those listed above, when they are encountered in the role of corporate manager, lawyer, or physician. Alternatively, the program could be followed by more intense specialization in a specific engineering discipline at the master’s degree level.

Within the total of 32 courses (128 credit hours) required to earn the BA in engineering science, a minimum of eight courses must be in the natural sciences disciplines, including at least one course in chemistry, two in physics, and three in mathematics. The latter must include a course in differential equations (typically MTH 163). Two additional courses in these or other natural science disciplines are also required. Additional course requirements include one course in computing (CSC 170 or equivalent), and at least eight courses in engineering, including at least one laboratory-intensive course. The opportunity to take courses in depth from several engineering disciplines is a unique aspect of this program.

To earn the BA in engineering science, students must satisfy the primary and upper-level writing requirements and also must complete two clusters, one in the humanities and one in the social sciences.

Totaling the above course requirements leaves from five to eight courses available as free electives. This permits students considerable flexibility in shaping programs that reflect personal interests.

The BA/ES program is administered by the Committee on Interdepartmental Programs. Approval of the committee is required for each proposed program of study. Admission to the program at the end of the sophomore year requires an overall grade point average of at least 2.0, together with completion of the following nine courses with a GPA in these nine courses of at least 2.3: one primary writing course; three math courses, including a course in differential equations; three physics and chemistry courses, including at least one course in each; and at least two engineering courses.

Programs meeting degree requirements are to be worked out in consultation with an appropriate member of the program committee. Interested students—including potential transfer students—may obtain information and application forms from the Dean’s Office in 301 Lattimore Hall.

Upper-Level Writing Requirement

Significant writing experience in one’s discipline is an important adjunct to the technical material one learns, and that experience is gained through upper-level writing courses in which a significant weight is given to the effectiveness of written communication. For students in the BA in engineering science or the BS in engineering and applied science, the upper-level writing requirement is satisfied by taking two or more of the courses that satisfy the upper-level writing requirement in the “traditional” engineering programs. Otherwise the students and the IDE Committee stipulate in the students’ plan where writing experience is to be gained. BME 101, 260, 396; CHE 246, 255, 275/4; ECE 111, 112, 113, 399; ME 204, 205, 211, 213, 223, 241, 242, 251; OPT 246, 300, 397 are engineering courses that can be used to fulfill the requirement for BA/ES and BS/IDE majors.
The Eastman education prepares students artistically, intellectually, and professionally for the challenging world in which musicians now live, and, importantly, instills a sense of mission about the value of music. Noted industrialist George Eastman established the school in 1921 as the first professional school within the University of Rochester, believing that a broad foundation in the liberal arts was a necessity for all musicians. Eastman’s far-sighted vision is integral to the school’s central principles.

In recent years, changes in the culture and marketplace for classical music have led the Eastman School to engage in innovative curricular reform designed to educate the musician of the future. Several new programs, certificates, and diplomas aim to motivate and educate students to discover new ways to engage audiences in diverse communities; empower students to think entrepreneurially about music careers and related professional opportunities; and challenge students to influence and direct the future course of classical music.

More than 100 highly regarded performers, composers, conductors, scholars, and educators make up the Eastman faculty. Nearly 900 students are enrolled in Eastman’s collegiate division—about 550 undergraduates and 350 graduate students. Approximately 2,000 applications are received each year, and about 135 freshmen and 125 graduate students are admitted. Students come from every state, and nearly 25 percent are international.

For all students at the University, as well as residents of the Rochester community, the Eastman School serves as a rich and vibrant resource. More than 700 performances (including concerts, recitals, and operas), most of them free of charge, are offered at the Eastman Theatre, Kilbourn Hall (a superbly constructed chamber music hall), the new Hatch Recital Hall, and various other sites at the Eastman campus and throughout the Rochester area. These include performances by internationally known artists as well as faculty and students.

A separate academic bulletin, available through Eastman’s Office of Admissions, fully details the Eastman School’s programs. Prospective students are also encouraged to visit the school’s website at www.rochester.edu/Eastman for additional information about the Eastman School, the programs, and the people; admissions forms; information on audition repertoire and scheduling; and tuition information.

Also reach various school departments as follows:

- General Eastman information: (585) 274-1000
- Admissions Office: (800) 388-9695 (U.S.A. and Canada) or (585) 274-1060
- Admissions email: admissions@esm.rochester.edu
- Recorded concert information (24 hours a day): (585) 274-1100
- Community Music School: (585) 274-1400
- Financial aid: (585) 274-1070
- Graduate studies: (585) 274-1560
- Sibley Music Library: (585) 274-1350

All undergraduates have a performance concentration in one of the following: bassoon, cello, clarinet, double bass, euphonium, flute, guitar, harp, horn, oboe, organ, percussion, piano, saxophone, trombone, trumpet, tuba, viola, violin, voice.

Eastman offers the following bachelor’s, master’s, and doctoral degrees:

- Bachelor of Music: composition; applied music; musical arts; music education; jazz studies and contemporary media (performance and writing skills); theory
- Master of Arts: composition; music education; musicology; ethnomusicology; theory; theory pedagogy; music education with teacher certification
- Master of Music: composition; music education; conducting (choral or orchestral); music education with teacher certification; jazz studies and contemporary media (performance or writing skills); performance and literature; opera (performance or stage directing); early music (emphasis in historical plucked instruments)
- Doctor of Musical Arts: composition; performance and literature; music education; conducting; piano accompanying
and chamber music; jazz studies and contemporary media; early music (emphasis in historical plucked instruments)

- Doctor of Philosophy: composition; music education; musicology; theory

Additionally, the Eastman School and the University’s College together produce a variety of ways in which undergraduates at Rochester can choose to study music, often in combination with other fields. The bachelor of arts with a concentration in music is based within the College on the University’s River Campus. The BA student majoring in music has access to the full range of resources of both a major private university and one of the world’s leading music schools. The program has extraordinary opportunities for students who wish to pursue musical interests as the core of a liberal arts education.

Qualified College students may study privately at Eastman. College music majors have a wide selection of Eastman courses from which to choose for elective credit. A student may combine music and nonmusic study by actually applying to and completing two different degrees simultaneously (such as a BM in voice performance at Eastman and a BA in German at the College).

Choosing between these options can be challenging. The Office of Admissions at Eastman and the College Department of Music are wonderful sources of information for students contemplating a combined course of study at Eastman and at the College, or needing clarification on the differences between degree programs.
School of Nursing

Kathy H. Rideout, EdD, PNP-BC, FNAP (Rochester)
Interim Dean

The overriding philosophy of the School of Nursing is the unification of education, research, and practice. The Unification Model supports the University of Rochester School of Nursing’s mission and vision.

Mission Statement
Shaping the future of health care through excellence in nursing education, discovery, and practice.

Vision Statement
Shaping the nursing profession and the nation’s health through scientific discovery, learning, and clinical excellence.

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 communications, 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 an 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.

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 and encourages students to value and respect diversity and practice nursing in a culturally sensitive manner. A rigorous professional education prepares leaders in nursing who shape current and future responses to ethical, political, economic, health, and nursing issues. Consistent with the University’s mission, the School of Nursing fosters individuality, critical thinking, scholarship, and commitment to lifelong learning.

Programs of the School of Nursing are registered with the State Education Department of the University of the State of New York, Professional Education, West Wing Education Building, Washington Avenue, Albany, NY 12244, (518) 486-2967. Baccalaureate and master’s programs are accredited by the Commission on Collegiate Nursing Education (CCNE). Nursing students and graduates 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.
BS in Nursing

The curriculum is designed to be more responsive to adult learners, and this is the focus of the baccalaureate nursing program.

Students are assigned an advisor when they are admitted to the University. The advisor assists students in planning an academic program to fulfill graduation requirements; counsels students concerning coursework and progression in the program; and provides 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.
   The APNN-BS program requires a minimum grade of 73 (C/2.0) in all required courses.
3. A minimum of 32 hours of coursework at the School of Nursing for RN programs (49 credit minimum for accelerated programs for non-nurses).

In compliance with New York State regulations, immunization updates are required annually for all students in health profession programs. For students taking evening courses, escort services are available to transport students to University parking lots.

Additional information about the nursing curriculum and an application may be obtained by contacting: Student Affairs Office, University of Rochester School of Nursing, Box SON, 601 Elmwood Avenue, Rochester, NY 14642-0001; (585) 275-2375; www.son.rochester.edu.

Programs

Accelerated Programs for Non-Nurses Requirements

Students apply to either the one-year Accelerated Bachelor’s Program for Non-Nurses (generalist preparation and eligibility to complete registered nurse licensure) or the three-year Accelerated Master’s Program for Non-Nurses (additional nurse practitioner preparation in one of these specialty areas: adult, family, adult/geriatric, pediatrics or pediatrics with behavioral mental health specialization, psychiatric/mental health—adult/family, acute care, and psychiatric/mental health—child/adolescent.

The generalist curriculum consists of 49 University of Rochester nursing credits, including 33 didactic credits, 3 lab credits, and 13 clinical credits (with a minimum of 728 clinical hours).

Prerequisites
- Non-nursing bachelor’s degree with preferred GPA 3.0/4.0
- Anatomy and Physiology
- Microbiology
- Growth and Development
- Nutrition
- Statistics

Semester I (17 credits)
- NUR 370. Pathophysiology/Pharmacology (6 credits: 6 theory credits)
- NUR 362. Comprehensive Health Assessment of the Individual (3 credits: 2 theory credits; 1 lab credit)
- NUR 372. Therapeutic Interventions I (4 credits: 1 theory credit; 2 clinical credits; 1 lab credit)
- NUR 373. Nursing Science (2 credits: 2 theory credits)
- NUR 378. Genetics (2 credits: 2 theory credits)

Semester II (16 credits)
- NUR 374. Childbearing/Childrearing (7 credits: 4 theory credits; 3 clinical credits)
- NUR 375. Psychiatric Mental Health (4 credits: 2 theory credits; 2 clinical credits)
- NUR 301. Principles and Application of Evidence for Nursing Practice (4 credits: 4 theory credits)
- NUR 376. Therapeutic Interventions II (1 credit: 1 lab credit)

Semester III (16 credits)
- NUR 371. Management of Care (4 credits: 4 theory credits)
- NUR 377. Adult and Home Nursing (8 credits: 4 theory credits; 4 clinical credits)
- NUR 379. Nursing Integration and Transition to Practice (4 credits: 2 theory credits; 2 clinical credits)

Specialist Curriculum

The specialist component consists of the existing master’s curriculum and is composed of
- professional core courses developed to provide common substantive areas of study for students from different clinical components
- clinical specialty courses relating more directly to one or more clinical specialties
- successful completion of a written comprehensive examination will demonstrate students’ abilities to integrate knowledge gained through individual courses into critical thinking as Advanced Practitioners.

Before beginning MS clinical courses, students must pass NCLEX and have a minimum GPA of 2.5.

RN to BS Program Requirements

Arts and Sciences Courses (64 credits)
- Humanities (e.g., English, fine arts, language, philosophy, religion, history)—9–12 credits (three college-level courses)
- Natural sciences (e.g., chemistry, biology, microbiology, anatomy, physiology, physics, geology, environmental sciences)—12–16 credits (four college-level courses)
- Social sciences, including statistics (e.g., psychology, sociology, anthropology, human development, economics)—12–16 credits (four college-level courses)
- Free electives (non-nursing)—to total 64 arts and sciences credits
Nursing Courses (64 credits)
First 32 credits awarded automatically upon matriculation for all nursing coursework from an accredited diploma or associate’s degree program.

Final 32 credits (residency requirement)
Eight core courses (primarily online)
- NUR 350. RN/BS Transition: Reflective Professional Practice (3–7 credits*)
- NUR 301. Principles and Application of Evidence for Nursing Practice (4 credits)
- NUR 319. Pharmacology/Pathophysiology Update for RNs (4 credits)
- NUR 354. Concepts of Leadership and Management (4 credits)
- NUR 355. Contexts of Health Care: Finance and Regulatory Environments (3 credits)
- NUR 356. Population Health (5 credits)
- NUR 357. RN/BS Capstone Project (2 credits)
- NUR 364. Biopsychosocial Health Assessment of the Individual and Family (3 credits)
- NUR XXX. Nursing Electives (0–4 credits)

RN to BS to MS Program Requirements
A combined baccalaureate-master’s degree program in nursing is available for select registered nurses with well-defined career goals. Requirements vary by master’s specialty (the following MS nurse practitioner preparation programs: Adult NP, Adult NP/Geriatric NP, Family NP, Acute Care NP, Care of Children and Families/Pediatric NP, Care of Children and Families/Pediatric NP with Pediatric Behavioral Health NP option, Care of Children and Families/Pediatric NP/Neonatal NP, Psychiatric/Mental Health NP—Adult/Family or Child/Adolescent). The arts and sciences requirements are the same as those in the RN to BS program. There are three baccalaureate-level “bridge” courses in addition to the MS coursework. For more information about this program, please contact the Office of Student Affairs, (585) 275-2375.

COURSES OF INSTRUCTION
Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

301. Principles and Application of Evidence for Nursing Practice.
This course provides an introduction to evidence-based practice and the critical appraisal of best evidence literature. Students learn to formulate clinical questions in answerable format, search for and identify best evidence, and appraise that evidence for rigor and applicability to the clinical problem. Best evidence consists of pre-appraised individual studies and overviews. Basic principles of scientific inquiry, quantitative and qualitative research methods, and research ethics are introduced in the context of clinically relevant research.

311. Statistics for Health Sciences.
This course is an introduction to the basic techniques of statistical analysis with particular application to the health science research. Topics include levels of data measurement, descriptive statistics and data display; probability, significance, power, and parameter estimation; and hypothesis testing as inferential techniques. With the use of statistical software, the student develops the ability to choose and conduct appropriate statistical tests for the analysis of simple data sets and ability to interpret the results of those analyses. Statistical techniques introduced are correlation, regression, Chi-square, t-test, analysis of variance, logistic regression, and confidence limit estimation.

319. Pathophysiology and Pharmacology Updates for RNs.
This hybrid online and seminar course is designed to provide a solid overview of current knowledge about the pathophysiology of commonly seen diseases and related updates in pharmacology. Current physiological thoughts about the basis of disease and pharmacodynamics of newer drugs designed to treat select diseases will be presented and students will apply that information to select clinical scenarios.

350. Reflective Practice.
This is the first course in the RN/BS completion program. The focus of the course is on reflective practice and providing students with the conceptual basis and tools to be successful in the program. Personal values, philosophy and goals are examined as part of the process of creating a professional portfolio to document accomplishments to date. Content includes: historical, ethical, legal and theoretical foundations of nursing, social justice and diversity, and professional nursing issues and trends. In addition, students are introduced to foundations of information technology and applications to professional nursing practice. Students will be taught to employ search strategies for retrieval of scientific literature to support evidence based practice.

This course provides an introduction to the fundamental principles of leadership and management pertinent to health care. Students will explore the interrelated processes of thinking systematically, developing reflective judgment, and exercising leadership. Competencies necessary to succeed in a nursing leadership role in complex organizations are analyzed and applied to clinical scenarios. Students utilize self-reflection to assess their own leadership potential and apply concepts through discussions and class assignments. A field study component enables them to observe a nurse in an established leadership role and participate in a performance improvement project.

* 1–4 additional academic credits possible through the portfolio process as part of NUR 350 (petitioning for prior learning/life experience)
This course examines the changing context of health care systems and the settings in which services are provided. Forces affecting the delivery and utilization of health care services are examined. This course exposes students to a variety of health care systems and explores the environment in which nursing and health care is provided. Selected issues related to health service provision are examined including managed care, nursing case management, and collaborative community partnerships.

The course uses a synthesis of public health theory, epidemiology, theories of health promotion, and nursing theory to enable students to identify health concerns and promote health and wellness in selected communities, while emphasizing diversity. The impact of current practices, policies, and laws on community health will be addressed. Issues in population health over the lifespan will be explored, such as environmental health, emerging infectious diseases, vulnerable populations, chronic illness, and global health care. How to acquire and analyze data for health promotion and disease prevention will be included. Online modules in Emergency and Disaster Preparedness and a field study with a vulnerable population and preventive health care project are part of the course.

357. RN/BS Capstone Course.
This capstone course is designed to allow the student to focus on the synthesis of knowledge acquired throughout the curriculum. Special emphasis is placed on the implementation of a safety, performance improvement or preventive health project in response to identification of needs/problems in a selected health care or community setting. The major assignment includes completion of a project identified by the student in NUR 354 or NUR 356. Professional role development and career planning are also addressed to facilitate career transition.

362. Comprehensive Health Assessment of the Individual.
This course builds on the biopsychosocial sciences and focuses on techniques of history-taking and physical examination in a cross-cultural context. Using a systems approach, focused and comprehensive assessments of essentially well clients throughout the lifespan are addressed. Students describe findings and differentiate normal from atypical or abnormal. Diagnostic reasoning skills are developed through analysis of the assessment data. A laboratory/clinical experience provides opportunities for students to integrate communication, assessment, and problem-solving skills with fundamental nursing care procedures. Prerequisite: Anatomy and Physiology.

370. Pathophysiology/Pharmacology.
This course focuses on the physiologic changes that occur as a result of disease processes, the clinical manifestations indicative of altered health and the drug therapy used to treat or effect these disease processes. The course integrates anatomy, chemistry, microbiology, physiology, and pharmacology and focuses on their application to clinical practice.

371. Management of Care.
This course prepares nurses to assume leadership roles by designing, managing, coordinating, and evaluating care in health care delivery systems. Content focuses on the role of the nurse leader in the care of populations and groups; planning and effecting change, quality improvement, securing and managing financial and human resources, developing effective teams and work groups, and utilizing informatics and other technology. Issues related to health service provision are examined including health care systems, population health programs, nursing case management, legal issues relative to nursing management, and selected professional concerns. This course includes clinical experience in clinical nursing leadership, case management, and other service delivery units.

372. Therapeutic Interventions I.
Therapeutic Interventions I is a clinical nursing course. This course focuses on acquisition of fundamental nursing skills. It is designed to also provide the student the opportunity to incorporate concepts and skills learned in Health Assessment in Health and Illness. It provides the student with a foundation for delivering therapeutic nursing care and interventions to individuals, families, and groups from diverse populations. In this course, the student will apply this learning in various practice settings to care for diverse consumers including individuals and families desiring health promotion as well as those experiencing alterations in health.

373. Nursing Science.
This course examines nursing through three conceptual lenses: what nursing is, what nurses do, and what nurses do in relation to others. An historical and theoretical perspective of nursing will be used to present these conceptual areas with application to current and emerging nursing practice.

374. Women’s Health, Neonatal, and Pediatric Nursing.
This course provides nurses with a basic understanding of childbearing and pediatric nursing principles in a variety of clinical settings. Students are introduced to current research, theory, and biological foundations of childbirth and child rearing. The course content incorporates the American Nurses Association Standards of Practice, current treatment modalities, and legal implications of caring for pregnancy women and children. Throughout the course, the role of the obstetrical and pediatric nurse is examined as the nursing process is applied to the care of patients bearing and raising children. Clinical experiences are coordinated in a variety of settings and offer students the opportunity to engage with clients and to interact with interdisciplinary teams in providing.

375. Psychiatric Mental Health Nursing.
The course provides nurses with a basic understanding of psychiatric and mental health nursing principles in a variety of clinical settings. Students are introduced to current research, theory,
and biological foundations of mental disease and mental illness. The course content incorporates the American Nurses Association Standards for Practice, current treatment modalities, and legal implications of caring for mentally ill clients. Throughout the course, the role of the psychiatric nurse is examined as the nursing process is applied to the care of patients with psychiatric-mental health needs. Clinical experiences are coordinated in a variety of settings and offer students the opportunity to engage with clients and to interact with interdisciplinary teams in providing care.

376. Therapeutic Interventions II.

The course focuses on the acquisition of selected complex nursing skills. This course provides students a laboratory foundation for delivering therapeutic nursing care and interventions to individuals that is applied to patients in concurrent or subsequent clinical specialty courses.

377. Adult and Home Nursing.

The student learns to utilize the nursing process to provide and evaluate culturally sensitive care for individuals and families experiencing adult health problems across diverse settings including home. The student also learns about nursing role development as a collaborative interdisciplinary team member. Students apply principles of evidence-based care in planning, providing, and evaluating patient care outcomes. Clinical experiences are coordinated in a variety of settings and offer students the opportunity to engage with clients and interdisciplinary health care members to provide care across the health continuum.


This course provides nurses with basic information about the influences of genetics on human health and illness, practice in applying important tools for effective genetic nursing practice with consumers from various cultures and ethnic heritage, an arena for consideration of ethical and social implications of genetic knowledge, and experience in the use of printed matter and computers to support evidence based health care and life-long learning in applied human genetics.

379. Nursing Integration.

This course provides an overview of the NCLEX exam process and format, as well as a comprehensive review of nursing concepts in preparation for professional nurse licensing examination (NCLEX).
William E. Simon Graduate School of Business Administration

Mark Zupan, PhD (MIT)  
Dean

Undergraduates at the University of Rochester can declare a major in business, thanks to a collaboration between the College and the Simon Graduate School of Business. The major is an extension of the pre-existing business minor. Classes are taught by both Simon and College faculty.

Simon Graduate School of Business also 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 major and a master of business administration degree.

**Early Leaders® Award and Scholarship Programs**

In the fall of 2005, the Simon School introduced its Early Leaders® award and scholarship programs that offer special scholarships to applicants with zero to three years' work experience. Candidates are nominated by those from an extensive network of Simon School or University of Rochester alumni as well as key influencers at top undergraduate liberal arts colleges nationwide. These individuals identify college sophomores, juniors, and seniors who seem to be likely candidates, using such criteria as strong written and oral communication skills; exceptional academic performance; leadership ability; a positive, “can-do” attitude; and the willingness to work hard. Nominees are eligible to have the $125 application fee waived and receive a Simon Early Leaders award. Those admitted to the Simon School become eligible for a $5,000 scholarship, at a minimum, and potentially, larger awards depending on the applicant profile. For more information on the Simon Early Leaders’ award and scholarship programs, visit www.simon.rochester.edu/simonearlyleaders/.

**The 3-2 Program**

**BA and MBA**

The Simon School cooperates with the College at the University of Rochester in offering a combined undergraduate and graduate degree program. The 3-2 MBA 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 MBA 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 MBA in one additional year.

**3-2 Program Facts**

- A bachelor's degree and an MBA degree are earned in five years.
- The program maintains all of the full-time MBA program requirements.
- Admission to the 3-2 program is limited and is offered only to exceptionally well-qualified students.
- Students must enter in September.
- 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

The 3-2 program requirements are the same as for the full-time MBA program. Applicants must
• have achieved outstanding scholarship in their first two and a half years of undergraduate study;
• have completed a business internship prior to commencing the MBA 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.

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 MBA program. Students are also required to pass the management communication sequence, and the same options are available for concentrations and electives. The MBA curriculum consists of 9 required core courses, 11 required electives, and a management communication course sequence.

The Core

The core curriculum is taken during the first three quarters. Students who enter the MBA program in September take the core curriculum in the fall, winter, and spring quarters. Students who enter the MBA program in January take the core curriculum in the winter, spring, and summer quarters. During the first three quarters, students complete the nine required courses, one or more electives, and the management communication sequence over two quarters.

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 comprises the following nine courses: ACC 401, Corporate Financial Accounting; STR 401, Managerial Economics; CIS 401, Information Systems for Management; FIN 402, Capital Budgeting and Corporate Objectives; GBA 411, Framing and Analyzing Business Problems 1; GBA 412, Framing and Analyzing Business Problems 2; OMG 402, Operations Management; MKT 402, Marketing Management; and STR 403, The Economic Theory of Organizations. A three-course management communication sequence is also required.

Concentrations and Electives

Elective courses in each of the 17 areas of concentration are devoted to applying, implementing, and integrating the principles learned in earlier courses.

Although students are not required to complete a concentration, most opt for at least one, and in many cases, two. Concentrations permit students to develop expertise in the following areas:

- Accounting and Information Systems
- Brand Management
- Business Environment and Public Policy
- Business Systems Consulting
- Competitive and Organizational Strategy
- Computers and Information Systems
- Corporate Accounting
- Electronic Commerce
- Entrepreneurship
- Finance
- Health Sciences Management
- International Management
- Marketing
- Operations Management
- Manufacturing
- Services
- Pricing
- Public Accounting

Up to two courses from other schools and colleges of the University may also be taken, with MBA Program Committee approval, when related closely to the students’ area(s) of concentration.

Application Information

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Concentrations

Accounting 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.

Brand Management
For those students wishing to become brand/product managers in either the consumer or industrial products markets or in financial services, a unique Brand Management Concentration is offered.

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.
Business Systems Consulting
This concentration offers a cutting-edge, highly focused program designed to equip students with the skills and experience necessary to excel in the business systems consulting enterprise.

Competitive and Organizational Strategy
This concentration focuses on business decision making in the competitive marketplace. The program is designed specifically to help students gain general management skills that can then be applied broadly within multidimensional business structures or consulting.

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.

Corporate Accounting
The corporate accounting concentration is actively recruited by corporations for positions in controllers’, treasurers’, and internal auditing offices, as well as in accounting departments.

Electronic Commerce
Managing in the rapidly evolving environment of Electronic Commerce requires an understanding of the technology infrastructure needed for e-commerce and the new business models that leverage on the special capabilities of the Internet. Students learn state-of-the-art tools for supporting the marketing, logistical, financial, and service-delivery aspects of doing business online. The concentration prepares students to create, manage, direct, and analyze e-commerce initiatives. Courses in this concentration combine ideas, cases, projects, and guest lectures by Internet entrepreneurs.

Entrepreneurship
The Simon School is committed to the teaching of entrepreneurship. The entrepreneurship concentration allows students to draw from a variety of carefully selected courses to become business generalists who are 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 databases on financial markets.

Health Sciences Management
The health sciences management concentration draws on the Simon School’s proven strengths and directs them to a dynamic industry. The Simon School’s concentration focuses primarily on two management issues: ongoing operations and strategic planning. This is in contrast to traditional master of public health degree programs, which generally focus on public policy issues. The program especially suits future health sciences consultants and front-line managers in health maintenance organizations, hospitals, insurance companies, and pharmaceutical firms.

International Management
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 6 credits) in an approved international exchange program.

Marketing
The marketing concentration continues to be a strong area of opportunity for graduates with an MBA. The concentration gives students excellent preparation for marketing research, marketing consulting, and product management.

Operations Management—Manufacturing
Operations Management—Services
Operations management is concerned with the managerial decisions by which a firm allocates and uses its physical, financial, and human resources to produce goods or services. The resurgence of interest in operational productivity has reinforced the demand for MBAs with the ability to analyze resource management problems in manufacturing and service firms.

Pricing
The pricing concentration is offered for those students who desire a state-of-the-art training in pricing and for those interested in pursuing a career in pricing.

Public Accounting
The public accounting concentration offers courses necessary for sitting for the Uniform Certified Public Accounting (CPA) examination in New York State and other states.

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 center. The Bradley Policy Research Center was established in 1966 to investigate the impact of government policy on business firms.

The Business and Government Information Library

The Business and Government Information Library offers world-class resources in finance, economics, entrepreneurship, marketing, statistics, accounting, operations research, and computer information systems. Resources are offered via the library’s website and can be accessed off campus. Articles from research journals and the business press, including news, are provided via the website as well as marketing reports, analyst reports, corporate financial data, and equity research materials. Services on the website such as chat and bulletin boards provide a way for students to ask questions and receive immediate assistance within the web environment.

The business library is located on the second floor of Rush Rhees Library. The space offers wi-fi, PCs, printing, and areas for group study. Library staff can assist students with locating material on the web and in print as well as assist with citing material used in papers or slide presentations.

The Simon School Department of Information Technologies

The Simon School Department of Information Technologies (IT) provides support services to all students, faculty, and staff. The Simon IT department offers services ranging from workstation and printing support through network and email services. The IT team is staffed by experienced support specialists.

The IT department and the Computing Center are located on the fourth floor of Schlegel Hall. The Computing Center is designed to support student needs with extended hours, technical support, and 30+ student-accessible workstations (Internet ready). The workstations are connected to centralized laser printers.

Although the Computing Center provides ample computing capability, students are required to own a laptop computer. Technology plays a significant role in modern business practices. It is this focus on the integration of technology into the Simon education that prepares students to enter and/or continue in the business world with technical confidence. For example, much of the MBA curriculum relies on spreadsheet, word processing, and statistical applications. Also, the eventual creation and maintenance of professional quality résumés and other important documentation rely heavily on students’ mastery of the productivity software that the Simon School provides.

Students may contact the Simon IT department for recommendations on hardware and software that will support the requirements of the current curriculum.

Career Management Center

The Career Management Center seeks to support the goals of its two primary constituencies—students and recruiters. The staff of the center possesses the expertise to provide innovative, customized services.

The Career Management Center’s counseling and education staff offers targeted, personalized one-on-one counseling to assist students through the stages of executing an effective career search strategy. From self-assessment and career exploration to plan development and implementation, a dedicated and knowledgeable counselor provides support and encouragement to Simon students.

The Corporate Relations arm of Career Management actively markets the Simon product to promote awareness and secure full-time and summer internship career opportunities with leading Fortune 500 companies, mid- to small-sized firms, and entrepreneurial start-ups. Corporate Relations partners with alumni business professionals, faculty, staff, and students, taking an integrated lead development approach to maximize overall marketing efforts.

Together, the partnership of counseling and corporate relations activities provides a strong foundation for career success for Simon students.

Courses of Instruction

Definitive course listings are published before each semester. Courses listed here carry 4 credit hours unless otherwise noted. Following are some of the recent or planned offerings.

Courses are offered in both day and evening sessions and are available to full- and part-time undergraduate students.

ACCOUNTING

201. Financial Accounting

This course is an introduction to the principles and procedures used by organizations to record economic transactions that affect them, and to report the net effect of these transactions to interested external parties. The course will cover the judgment inherent in certain aspects of the recording and reporting process, the acceptable alternatives for recording given transactions, and the effect these judgments and alternatives have on comparisons of the financial reports for different organizations, and on the usefulness of financial reports in general. In conjunction with this, consideration will be given to the failure of financial reports to fully incorporate the economic condition of an organization, and the reason for this.

221. Cost Accounting

A 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.

ENTREPRENEURSHIP

223K. Plan and Grow Business Ventures

This course provides a dynamic, practical, hands-on approach that encourages students to immerse themselves in the vision, research, and planning aspects of a new venture. It is designed to teach students how to research, develop, and write detailed plans that can be used to create successful new ventures. Students will learn
effective entrepreneurial practice that will make a difference in the ultimate success or failure of the entrepreneurial process.

225. Technical Entrepreneurship
This course teaches how to take a new business concept, analyze its viability, and develop a thorough business plan using a disciplined approach. Key topics will include market definition, research and analysis, sales, financial projections and analysis tools, team building, intellectual property and other legal issues, raising capital, and operations management. Students must come to the first class with a firm idea of a business concept they want to further develop. Students will be required to work in groups of 2 or 3 and will be required to write a business plan using the tools and methodologies provided. This course is most appropriate for those pursuing a degree in engineering or applied sciences. Others must ask special permission from instructor.

227. Entrepreneurship in the Not-for-Profit Environment
The intent of this course is "to promote intense rigorous intellectual exchange, both written and oral, in a seminar setting in which all participate in critical thinking and analysis of arguments." This seminar, which focuses on entrepreneurship in the non-profit environment (NPE), will explore the following questions: What is an NPE? What traits and capabilities are necessary to be a successful NPE? What social norms today would you like to see changed? How does change occur? How can social reform be enhanced if reformers adopt the principles inherent in building a sustainable business? How does a NPE go about making his/her dream into a reality?

FINANCE

204. Principles of Finance
Finance 204 is an introductory overview of basic financial management. The course content includes a discussion of the financial goals corporations, and other organizations, are likely to have. The course covers the means by which cash flows that occur at different times can be evaluated, and the criteria by which investment prospects can be analyzed, including a review of what levels of return should be acceptable in such evaluations. The course also focuses on how organizations raise funds, and what value bonds and stocks should have. The course includes an analysis of capital markets and the returns that various investments have yielded, as well as a discussion of how firms convey returns to their investors. The course is less in depth than Finance 205.

205. Financial Management
This course centers on how a firm is funded, and on how financial management can help maximize the financial rewards to those who own the firm, while meeting the obligations of the firm to other stakeholders. The effect of timing on the value of cash flows is developed at length, and is applied to the valuation of bonds and stocks. Various facets of stocks and bonds are also introduced, and a brief overview of the stock market is presented. Cash flow concepts are then incorporated into a development of how investment opportunities are analyzed, which includes a discussion of the strengths and weaknesses associated with different analytical methods. The topics of capital market efficiency and portfolio theory are then discussed and tied in to the concept of what investors have sacrificed in order to invest in a firm. This, in turn, is tied in to which investments are worthwhile to a firm’s owners.

206. Investments
The course will focus on financial investments. Coverage will include securities markets and how they work. Stock price behavior will be studied. This study will include topics such as market efficiency and the relationship of market efficiency to technical analysis. The study will also include anomalies; and behavioral finance. The structure of financial derivatives will be discussed. This discussion will focus on options, including the Black Scholes option pricing model, forwards, futures and swaps, as well as the use of these vehicles in hedging. Bonds will be examined along with the concepts of duration and reinvestment risk, and hybrids such as convertible securities will also be examined. Mutual funds will be studied along with other topics such as arbitrage pricing theory and multifactor models of risk and return. If time permits, topics such as financial statement analysis and international finance may be covered.

GENERAL BUSINESS ADMINISTRATION

241. Fundamentals of Personnel Administration
An introduction to how human resources are managed to maximize employee and organizational goals. Current human resource issues are explored. Topics include strategic planning, staffing, training and development, compensation, benefits, health and safety, union relations, and laws governing how organizations must treat people.

257. Fundamentals of Business Administration
An introduction to the principles of business, examining a wide range of problems businesses face today, using commercial successes and failures. The issues include how companies should consider identifying the markets for their products, leadership and motivation of employees, fund raising considerations and ethical issues facing business men and women. The class concludes with small group presentations and presentation of a modified business plan which integrates information studied during the semester.

291. Readings in Business Administration
Independent study in some specific area of business administration, at a level advanced beyond that of regular course offerings.
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 the legal structure of the major forms of domestic business enterprises. 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 court. Throughout, the emphasis is on developing an understanding of the reasoning process used by the courts and society to resolve disputes and define new law.

MARKETING

203. Principles of Marketing
Understanding customer's wants and needs and how the Marketing function goes about developing products and services to meet those needs on a continuous basis and optimize customer satisfaction as an end result. A detailed analysis and knowledge with regard to the basic marketing functions and the various marketing functions performed by marketing intermediaries—manufacturers, retailers, wholesalers, agents and others in the channel of distribution. Evaluation and discussion on key marketing topics: pricing, branding, promotion, channels of distribution, new products and services development and the creation of advertising and sales promotion programs to create consumer awareness with regard to those products and services. Culminating in a basic fundamental understanding and working knowledge of the marketing function within the firm.

213. Marketing Projects and Cases
This is a course that provides the student with an opportunity to focus on the practical application, in a real world business (profit or not-for-profit) environment of sound marketing principles and concepts. Students will be assigned to work with a local organization in terms of addressing a specific marketing opportunity or issue in the form of the development of a marketing plan for the organization. The typical marketing plan would include recommendations in the areas of: product, price, promotion and distribution, and overall marketing strategy. Student support in terms of problem analysis and marketing plan creation will be provided in the form of: case studies, guest speakers, and selected readings and lectures. Upon completion of the course, the student should be able to effectively develop and deploy a sound marketing plan.

OPERATIONS MANAGEMENT

201. Operations and Technology Management
This course intends to provide undergraduate business students with an understanding of Information Technology and Operations Management. Topics include: Enterprise resource planning, data management and databases, communications, supply chain organization, interorganizational systems, the internet and e-commerce, business and capacity planning, business process re-engineering and systems development. The instructor will use a combination of lectures, assigned case discussions and exercises to convey the material to the students. Lecture emphasis will be on the concept that IT and Operations Management are not represented by any one of their component fields (e.g., commerce, economics, science and technology, etc.) but that these are a delicate blend of them all; that these topics embrace integrated systems as a whole, not segments of a system. This course will be taken by undergraduate students with a business major or minor. Students should have a working knowledge of Excel.

MANAGERIAL ECONOMICS

203. Economic Theory of Organizations
The course combines basic economic concepts with agency theory and the concept of specific knowledge to develop a framework for addressing and solving important organizational problems. Key elements include: the assignment of the performance-evaluation system and the compensation/incentive system. Each of these elements is analyzed in detail. The framework is applied to analyze a variety of contemporary managerial topics such as total quality management, business-process re-engineering, outsourcing, transfer pricing, leadership and business ethics.

223. Pricing Strategy
This course prepares future managers to analyze the environment in which their firm/organization operates and to arrive at an appropriate pricing policy for the products or services. This course aims to equip students with a solid understanding of the relationship between a firm's environment and its optimal pricing strategy, robust frameworks for analyzing pricing decisions, and skills in applying this understanding to real pricing issues.
Margaret Warner Graduate School of Education and Human Development

Raffaella Borasi, PhD, MEd (SUNY, Buffalo)
Dean

The Warner Mission
At the Margaret Warner Graduate School of Education and Human Development, we believe that education can transform lives and make the world more just and humane. This vision informs our teaching, research, and service as a research school of education, as we strive to

- **Prepare** practitioners and researchers who are knowledgeable, reflective, skilled, and caring educators, who can make a difference in individual lives as well as their fields, and who are leaders and agents of change;

- **Generate** and disseminate knowledge leading to new understandings of education and human development, on which more effective educational policies and practices can be grounded;

- **Collaborate**—across disciplines, professions, and constituencies—to promote change that can significantly improve education and support positive human development.

Our diverse work in each of these domains is informed by the following underlying beliefs: the improvement of education is in pursuit of social justice; development and learning shape and are shaped by the contexts in which they occur; the complexity of educational problems requires an interdisciplinary and collaborative approach; and best practices are grounded in research and theory, just as useful theory and research are informed by practice.

Programs
The Warner School offers master’s and doctoral degree programs that may be of interest to undergraduates considering graduate work in education and human development. Students are encouraged to take courses in these programs as undergraduates, both to explore the interesting intellectual and career opportunities available in education and to possibly get a “jump start” on graduate work. Many undergraduates apply to Warner programs in teaching and curriculum, counseling, human development, higher education, and educational policy in their senior year. Undergraduates interested in becoming a teacher are encouraged to complete all subject area requirements at the undergraduate level. We expect students entering our teacher preparation program to have already fulfilled these prerequisites by the time they complete their undergraduate degree. Consult with a counselor in the Warner School Admissions Office, (585) 275-3950, or visit the web at www.warner.rochester.edu for exact requirements for the specialization you are considering.

Teaching and Curriculum
The Warner School offers a Master of Science (MS) in Education leading to New York State Teaching Certification for those interested in teaching at the following levels: Early Childhood (birth–grade 2), Childhood (grades 1–6), Middle Childhood (grades 5–9), Adolescence (grades 7–12), and Middle Childhood and Adolescence (grade 5–12). Programs in Early Childhood and Childhood prepare students to teach all subject matters, while secondary programs require specialization in one (or more) of the following subject matters: English, mathematics, social studies, biology, chemistry, physics, earth science, French, Spanish, German, or Latin. Programs for those interested in Teaching English to Speakers of Other Languages (grades K–12), Teaching Students with Disabilities, and Teaching Literacy (at either birth to grade 6 or grades 5–12) are also available. In addition, the Warner School offers the master of arts in teaching (MAT), leading to New York State Teaching Certification in Adolescence (grades 7–12), which combines secondary teacher preparation coursework with advanced work at the College in the subject area of specialization.

At the doctoral level, the Teaching and Curriculum program offers a doctor of education (EdD) in Teaching and Curriculum and a doctor of philosophy (PhD) in Education, with a concentration in teaching, curriculum, and change.
Health Professions Education
A new master of science (MS) degree in Health Professions Education, an interdisciplinary program designed by and offered through a collaboration of the Warner School, the School of Nursing, and the School of Medicine and Dentistry at the University of Rochester, is now offered for health care professionals, including nurses, doctors, physical therapists, and nutritionists, who are in health care education and those who are interested in moving into such positions and who seek formal training in education. The interdisciplinary program provides theoretical and practical preparation for teaching and related skills to health care professions.

Counseling and Human Development
Counseling
The Warner School offers master of science (MS) degrees in the areas of school counseling and community mental health counseling. The master’s programs prepare counselors who are empowered to help and pursue leadership roles in schools and community agencies as facilitators of healthy human development and advocates for change within systems. At the doctoral level, the doctor of education (EdD) in Mental Health Counseling and Supervision or Counseling and Human Development, with a concentration in counseling, and the doctor of philosophy (PhD) in education, with a concentration in counseling and counselor education, are offered.

Human Development
The Warner School offers a master of science (MS) degree in the area of human development. Specializations are offered in gerontology, family studies, early childhood, developmental differences, and research. The master’s program prepares professionals to pursue positions in health and human service agencies, research projects, case management, and family outreach, and many continue their education in doctoral programs. At the doctoral level, the doctor of education (EdD) in Counseling and Human Development, with a concentration in human development, and the doctor of philosophy (PhD) in education, with a concentration in human development and educational contexts, are offered.

Educational Leadership
K–12 School Leadership
The Warner School offers students numerous options in the study of K–12 school leadership, ranging from a nondegree program leading to New York State certifications for K–12 school administrators to doctoral programs that combine advanced coursework and research in administration. The master of science (MS) degree in educational administration is offered with a concentration in K–12 school administration, and at the doctoral level, the doctor of education (EdD) in educational administration is offered with a concentration in K–12 school administration. Through our MS, EdD, and certification programs, we prepare students to become skilled, knowledgeable, and creative leaders in elementary and secondary schools and districts, as well as professors and researchers of school administration and leadership at postsecondary institutions.

Higher Education
The Warner School’s master’s programs in higher education prepare thoughtful administrators and researchers for positions at postsecondary institutions, in government, and in many organizations that work with and for colleges and universities. The master’s with a concentration in student affairs administration offers students an opportunity to combine practical leadership experience in student affairs with a dynamic academic program. The master’s with a concentration in general higher education administration provides this same energy with a focus on administration and governance. At the doctoral level, the doctor of education (EdD) in educational administration is offered with a concentration in higher education and the doctor of philosophy (PhD) is offered with a concentration in higher education.

Educational Policy
A new master of science (MS) degree in educational policy is now offered for those interested in assuming policy positions or planning to pursue doctoral study in areas related to educational policy. The master’s program enables students who want to have a meaningful impact on schools, school systems, and the lives of children to influence policy, design, implementation, and evaluation and serve as a catalyst for improving America’s schools. The 30-credit program makes it possible for candidates to receive their degree in one year of full-time study (if starting in the summer or taking a few courses as an undergraduate). Graduates acquire a deep understanding of our education system and education reform nationwide and are prepared to work as policy analysts, educational policymakers, and researchers at government agencies, nonprofit organizations, and districts, where they will help formulate new strategies and evaluate their effect. At the doctoral level, the doctor of philosophy (PhD) in education is offered with a concentration in educational policy and theory. This program is geared toward students who have an advanced degree in policy, political science, economics, sociology, or a related area and are interested in a career in policy research and analysis.

Perspectives on Education for Undergraduates
While the University does not offer a bachelor’s program in education, undergraduates interested in education and human development—and the many issues related to schools, socialization, learning, and growth—are encouraged to take courses at the Warner School. Issues such as the relations among race, gender, language, ethnicity, class, disability, and schooling; the uses of technology as teaching and learning tools; the application of sociocultural theory and research to human learning and development; the ties among economic, social, and educational practices and policies; and other matters of significance to contemporary society may be studied at the Warner School. Warner courses may complement undergraduate programs in the College and/or
offer undergraduates the opportunity to explore new intellectual areas and career opportunities in the educating professions. It may even be possible to begin studies for specific careers at the Warner School as an undergraduate. Students who are interested in a career in education are encouraged to meet with a Warner admissions counselor to learn more about Warner’s programs and opportunities for coursework as an undergraduate. The Office of Admissions offers day and evening appointments for student counseling and school tours. The Warner School is located in Dewey Hall on the Eastman Quadrangle opposite Lattimore Hall. Contact Admissions at (585) 275-3950 or visit on the web at www.warner.rochester.edu.

The Warner School offers several exciting programs designed exclusively for College undergraduates, including some of the following.

**Teacher Preparation**
Due to changes in the New York State teacher certification requirements, the Warner School no longer has a teacher education program at the bachelor’s level. Undergraduates interested in a career in teaching are encouraged to take courses at Warner and seek classroom experience to help get a head start on a graduate program in their area of interest. Starting teacher education coursework as an undergraduate provides students with the opportunity to explore and better understand the teaching profession and can allow for the completion of a master’s degree and New York State Teaching Certification in one additional year of study. In most cases, the basic teacher preparation program (leading to NYS Initial Teaching Certification and fulfilling all the academic requirements for Professional Teaching Certification) is offered through 15 months of postgraduate study and is offered at the early childhood and elementary levels; in English, mathematics, Latin, French, Spanish, German, biology, chemistry, physics, earth science, and social studies at the secondary level; and in Teaching English to Speakers of Other Languages in grades K–12 and Teaching Literacy.

Students considering a career in teaching are also encouraged to complete all subject area requirements at the undergraduate level. New York State specifies the number of hours in various subjects required for certification (usually about 30 undergraduate credits in the subject of specialization, but there are some variations so make sure to check), including at least one college-level semester in a foreign language (ASL is also acceptable). Consult with a counselor in the Warner School Admissions Office, (585) 275-3950, for exact requirements for the specialization under consideration.

**Fifth Year in Teaching Program/Urban Teaching and Leadership Program**
The University of Rochester recognizes the critical need for teachers of traditionally marginalized students and through the Warner School of Education offers a unique program to encourage its undergraduates from diverse backgrounds and subject areas experiencing shortages to enter the teaching profession and be prepared to teach in urban settings. The Fifth Year in Teaching Scholarship provides a limited number of full-tuition awards for graduate study to University of Rochester undergraduates who apply to the Warner School during their senior year to become teachers in urban settings. Successful applicants are accepted into the Urban Teaching and Leadership (UTL) Program, where they will complete a master’s program in teaching and curriculum, leading to NYS Initial and Professional Teaching Certification, and two years of teaching in an urban school. In addition to their coursework and field requirements for certification, UTL students participate in monthly seminars that focus on critical approaches to teaching in urban settings. The goal of the UTL Program is to prepare talented classroom teachers who are committed to social change and who will address the inequalities confronting public education in America’s cities. Through a unique partnership between the Warner School and the Rochester City School District, the UTL Program equips urban educators to combine a passion for social justice with innovative teaching practices to improve the quality of education for all youth.

The Fifth Year in Teaching Scholarship has been designed to help the Warner School address the needs of urban schools by encouraging qualified University of Rochester undergraduates to become skilled teachers in urban areas. Recipients of the award include individuals who are able to increase the diversity of the urban teacher population or increase the number of certified teachers in specializations where there are the highest shortages in the Rochester area.

These scholarships cover full tuition as well as on-campus room and board for students who prove financial need (some restrictions apply). Upon acceptance of the Fifth Year in Teaching Scholarship, candidates make a commitment to successfully obtain their master’s degree from the Warner School, become certified to teach by the NYS Department of Education, teach in an urban school for two complete academic years following graduation, and complete all UTL postgraduation coursework and requirements. Please visit www.warner.rochester.edu/admissions/finaid/fifthyear.html for more details on eligibility.

**Combined Undergraduate/Graduate Programs in Counseling and Human Development**
The combined undergraduate and graduate programs in counseling and human development offer an opportunity to qualified University of Rochester undergraduate students to begin graduate study toward the master of science (MS) degree during their senior year. The master’s program in human development can be completed after one year of postgraduate study. The school counseling program, which leads to New York State certification as a school counselor, takes about two years of postgraduate study. The program in community mental health counseling, which leads to New York State licensure in mental health counseling, also can be completed in about two additional years.

In the first year of a combined program, students who are in their senior year and are simultaneously enrolled in the master’s degree program finish their undergraduate work and receive the bachelor’s degree in their undergraduate concentration at the end of the senior year. In the human development program, they must complete a minimum of 15 credit hours of graduate coursework in their senior year, which can also be counted toward their
undergraduate degree, and then an additional 30 credits of graduate coursework in human development (for a total of 45 credit hours). For the counseling programs, students in the 48-credit-hour school counseling program may take 9 credit hours of graduate coursework during their senior year and students in the 60-credit-hour school counseling program and the community mental health counseling program may take up to 21 credit hours during their senior year. A master’s capstone project and, in the case of the counseling programs, internships are required. Applications for the combined programs must be completed no later than spring semester of the junior year. Admission requires that the students’ undergraduate concentration be completed by the end of the junior year or assurance from the concentration department that the requirement for the bachelor’s degree will be met by the end of the senior year. Early inquiry is encouraged, especially from sophomores and first-semester juniors.

Guaranteed Rochester Accelerated Degree in Education
The Guaranteed Rochester Accelerated Degree in Education (GRADE) is a five-year BA/BS + MS education program for undergraduate students admitted to the University of Rochester who are interested in becoming educators (six years if pursuing a specialization in counseling). GRADE students enter the University with an assurance of admission to the Warner School (provided that they meet the prerequisites for their selected area of specialization by the time they complete their undergraduate degree) with the Steven Harrison quarter-tuition scholarship for the duration of the program. The program is designed to offer students a quality liberal arts education while also preparing them to become educators. Students who are already admitted as GRADE students, should contact their advisor to discuss how they can best maximize the program.

Courses of Instruction
Definitive course listings and complete descriptions are published before each semester and are available on the Warner School website at www.warner.rochester.edu. Courses listed here carry 3 graduate credit hours unless otherwise noted.

Undergraduates are encouraged to explore Warner School courses offered in teaching and curriculum, higher education, educational policy, counseling, and human development. The following courses are among those available to undergraduates. Students interested in pursuing a future degree from the Warner School and who hope to take courses that will count toward these programs are encouraged to consult with a counselor in the Office of Admissions at (585) 275-3950 to ensure appropriateness for the program of interest. Please note that the successful completion of coursework does not guarantee admission to Warner programs, and final decisions about transfer credits can only be made at the time the students’ “program of study” is approved.

With the approval of students’ undergraduate academic advisors and the Warner School registrar, students are welcome to take additional introductory graduate courses (400 level).

ED 410. History of American Education
Explores 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. Investigates the processes of cultural transmission across four centuries of American history, beginning in the mid-1600s, but with the major emphasis on post-1900 themes. Intended as a first foundation course in the history of American education. (Fall, most odd years)

ED 411. Philosophy of Education
Examines a range of contemporary controversies and historically influential philosophical theories of education as a vehicle for critical reflection on the political, moral, epistemic, and linguistic aspects of educational practice. Topics include: the place of education in a just and stable society; the role of education in promoting human freedom, goodness, and well-being; the nature of knowledge and human excellence, and how they develop; the curriculum and how to teach for understanding and intellectual autonomy; the relative authority and responsibility of family and state in providing and determining the content of education; and the issues arising from differences of culture, religion, and ability. (Summer, even years)

ED 412. Sociology of Education
Integrates sociological theory, policy studies, and contextual applications in respect to education, schools, communities, and professional practices.

ED 415. Adolescent Development and Youth Culture (ages 10 to 20)
Develops an understanding of what it means to be an adolescent in present day American culture. Explores adolescent development as an integral part of life-span development, employing cultural, psychological, social, and biological perspectives. Examines popular culture, the commodification of youth culture, and media practices that shape and influence adolescent development. (Fall and Summer A)

ED 418. The Family and Social Dynamics
Introduces the basic dimensions and dynamics of the family as a social institution and as a significant context for individual development. Explores the nature and dimensions of the institution of the family across cultures and history; alternative theoretical approaches to the family; the connections between the family and other social institutions, such as work, education, and government; and the implications of the analysis of family for social policy related to the practice of counseling and other educating professions. (Spring, most even years)

ED 419. Life Course Studies
Examines the popular myths and misunderstandings about aging and the life course by critically surveying existing scholarly knowledge, research, and theory about the life course and examining how the individual’s biographical experience and view of his or her personal past and future are shaped both by societal institutions and interpersonal expectations. (Fall)
**ED 425. Minority Youth Development in Urban Contexts**
Provides an exploration of developmental and sociocultural processes that impact long-term outcomes for minority students. Examines influential environmental issues that focus on cultural, educational, structural, and sociopolitical factors. Students acquire an understanding of how these influences (e.g., racial socialization, parental stressors, and residential segregation) can impact development for minority children and how this knowledge can inform intervention strategies. (Spring)

**ED 428. Ethics and Education**
Explores the moral dimensions of education and educational leadership in K–12 and higher education settings. Examines a range of ethical problems associated with educational institutions and the moral dimensions of educational leadership.

**ED 429. Theories of Human Development**
A comprehensive introduction to multidisciplinary approaches to human development within the behavioral and social sciences. Explores theories of human development and the process of individual change over time that occur in social, cultural, and historical contexts. Examines central theories of transformation and development that explain human behavior, environmental factors that affect both normal and abnormal behavior, and the systems (school, family, and community) that interact to affect an individual's development. (Fall and Summer A)

**ED 436. How Universities Work**
Today’s universities are far from simple organizations and do not conform to the traditional organizational models and cultures seen in business, government or even K–12 operations. This course explores the obvious and hidden complexities, interdependencies and organizational challenges of the modern university through a combination of academic content and practitioner presentations by key leaders from the university and higher education. (Fall)

**EDU 440. LGBTQ Issues in Education and Human Development**
Addresses current issues related to the education and developmental needs of lesbian, gay, bisexual, transgendered, and queer students in K–12 schools and in higher education. Examines heterosexism, gender oppression, and homophobia in schools, and analyzes schools as sites for transforming or transmitting cultural values/norms related to gender and sexuality. Explores historical, legal, social, and political trends that have an impact on schools’ ability to address these issues and examines connections and intersections among heterosexism, gender oppression, homophobia, sexism, and racism in schools, with a focus on specific concerns of lesbian, gay, bisexual, transgender students, parents, and educators in the educational setting. (Occasionally)

**EDU 442. Race, Class, Gender, and Disability in American Education**
Prepares educators to understand diversity issues, with the ultimate goal of eliminating existing practices of exclusion and inequality in schools and society. Surveys and critically analyzes literature on diversity, and encourages students to examine their own positions of identity, including race and ethnicity, class, gender and sexual orientation, language, religious belief, age, and ability, and the consequences of these identity positions on teaching and learning in diverse settings. (Fall, Spring, and Summer B)

**EDU 446. Entrepreneurial Skills for Educators**
Engages students in the development of skills and practices that make traditional entrepreneurs successful and examines how these practices can empower educators to be more effective leaders and agents of change. This course especially focuses on entrepreneurial attitudes and behaviors that can help educators expand their abilities to identify and evaluate opportunities, develop and implement carefully considered plans, build coalitions, secure resources, evaluate and manage risks, and create a culture that encourages creativity and initiative. By doing so, students become more effective in promoting innovations that can improve their institutions and better serve their clients. (Fall)

**EDU 455. Policy and Practice in Developmental Differences**
Introduces opportunities, support, and resources for individuals concerned with developmental differences and normalcy. Welcomes participants from various positions, interests, and experiences, including health and human service professionals, educators, family members, persons with developmental differences, and scholars. Oriented by a developmental, lifelong, and multidisciplinary approach, participants work to dispute dominant disability discourses of “lacks and absences” and to reconsider developmental differences as neither inherent nor “less than” what is needed. (Spring, most odd years)

**EDU 464. Child Development and Learning in Context (ages 5 to 12)**
Develops an understanding of what can be expected of children 5 to 12 years old. Examines the development of children from theoretical and empirical perspectives, emphasizing the role of a wide range of contextual factors in children’s development. Examines research trends and findings in the areas of language development, social development, intellectual development, learning, and achievement motivation. Distinctions between informal and formal learning provide a context for exploring the role that formal schooling can play in learning and development. (Summer A)

**EDU 467. Language, Literacy, and Cognitive Development**
Develops an understanding of how children develop oral communication, reading, writing, and other literacy skills, and how this development can be supported and enhanced. Explores
how children acquire, use, and expand their competence with language from infancy through their first years in elementary school. Examines the theory and research on the cognitive bases for language acquisition, the sequences of intellectual development that characterize infancy and early childhood, the nature of language-based interactions with others in the immediate environment, and the uses of language in the wider community. (Summer B, even years)

**ED 476. Administration of Student Affairs in Higher Education**

Introduces the history, philosophy, and purposes of student affairs and student services administration. Examines the theoretical and practical foundations of the student affairs profession. Explores issues and problems currently facing student affairs administration in the larger context of an ever-changing environment and the future of student affairs as higher education evolves. (Fall)

**ED 483. Communication and Counseling Skills for Teachers, Administrators, and Other Helping Professionals**

Introduces the educating or allied helping professional to the basic skills and core perspectives of counseling as a form of communication. Assists educators in facilitating effective interpersonal interactions by introducing them to basic listening skills, principles of group dynamics, theories of cross-cultural communication, and conflict-resolution strategies. (Fall)

**ED 485. College Students and Student Development Theory**

Explores psychosocial, cognitive-structural, identity, and typology theories of college student development. Discusses examples of application and use of student development theory in everyday student affairs practice. Drawing from current research in the field of higher education, this course provides information about the behavior and trends related to American college students. (Spring)

**EDU 485. College Access and (In)Equity**

Addresses theories and research on a variety of issues related to college preparation, school structures, and inequalities in college access. The course is organized into three levels of analyses: individual levels (e.g., race, ethnicity, and social class), organizational levels (e.g., family, geography, high school context, and outreach), and field levels (e.g., financial aid, testing, rankings, media, and affirmative action). Special attention will be paid to the sociocultural context, particularly on the role of families. (Fall)

**EDU 492. Governance, Policy, and Administration of Higher Education**

Examines the organization and governance of American higher education institutions, giving due weight to the context in which trustees, presidents, academic administrators, and faculty members make decisions. (Spring)

**EDU 493. History of Higher Education**

Provides a historical survey of, and examines critical issues in, the evolution of American higher education, beginning in the colonial era and extending to the present. (Fall, most even years)

**EDU 494. Human Development in Old Age**

Examines aging as a dynamic complex shaped by sociocultural and political processes that include issues of gender, ethnicity, social status, life experience, sexual orientation, and health/illness. Sociocultural ecologies of aging, such as families, communities, and societies, will be explored relative to developmental needs and resources. Introduces participants to a spectrum of community resources involved in supporting well-being in old age. (Spring, even years)

**EDU 498. Literacy Learning as Social Practice**

Develops an understanding of the social nature of language and literacy practices in and out of school. Examines theories of literacy learning and learning more generally, also addressing current debates in the field of literacy. Challenges students to rethink their definitions of what counts as literacy and their understanding of how people learn. Constructs an understanding of the social practice of literacy as the negotiation of the multiple linguistic and cultural realities of contemporary society across age levels and abilities. (Fall and Summer A)
This section is specifically for undergraduate students in the College.

**Academic Support Services**

In addition to consulting their assigned advisors, all undergraduate students in the College 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 the Rochester Curriculum (including majors, minors, and clusters), the “Take Five” Scholars Program, the Key Program, and preparation for the health professions are answered. The University Tutoring Program Office and Orientation Program Office are located in the center. Immediately adjacent, in 312 Lattimore, the Academic Services Counter serves as a focal point for quickly satisfying many routine academic inquiries, for dropping and adding courses, for making immediate appointments or walk-in arrangements to see an academic advisor, and for providing fast referrals to other offices.

**Edmund A. Hajim School of Engineering and Applied Sciences**

The Dean’s Office in 301 Lattimore 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, view the Academic Services and Information section of this bulletin.

The Hajim School of Engineering and Applied Sciences assigns faculty advisors to each known prospective engineering and applied sciences student in the first year to provide information about different engineering and applied sciences 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 school 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.

**Other Schools**

The Margaret Warner Graduate School of Education and Human Development offers advising and information assistance related to programs in education through its Student Services, 2-161 Dewey Hall, and through faculty of the school.

For School of Nursing student support services, please contact the school’s Student Affairs Office, (585) 275-2375.

**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 pre-major advisors begins during Orientation and continues throughout the students’ academic career at Rochester. Discussions with pre-major 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.

**Pre-Major Advisors**

Students interested in degree programs in arts and sciences work extensively with a pre-major advisor until the end of the sophomore year, or earlier if accepted into a major. They consult with their advisors when they register for courses and consider dropping or adding any courses. After being admitted to a major, students are assigned faculty advisors in the area of their majors.

Students interested in degree programs in the Hajim School of Engineering and Applied Sciences have faculty advisors from the desired majors assigned to them at the beginning of the first
year and are encouraged to consult with them frequently. These faculty will remain as the students’ advisors until graduation, unless students change majors or are reclassified to another graduating class.

Program Planning Workshops
During Orientation, just prior to the start of classes in the fall, faculty members representing all academic areas in the College are on hand to assist new students in choosing courses and completing their registration. In November and in April, during the registration period, students already enrolled who have financial clearance from the bursar select their courses with the help of their advisors and register online for the following semester. Each semester, just prior to registration, the College Center for Academic Support coordinates advising-related events where students may obtain help in planning programs, clusters, majors, minors, and sorting out the ways in which their academic goals may be fulfilled.

Registration
Entering students register for their courses online before and during Orientation, scheduled during the week prior to the start of classes. Returning students who have received financial clearance from the bursar may register online during regular registration periods. A person is not considered a student until registered.

Students who have not received financial clearance before the registration periods will forfeit their priority for course selection and lose the opportunity to participate in the room drawing procedure for on-campus housing.

In cases where students settle their accounts after the registration period, the bursar’s office will notify the registrar’s office that the students are cleared for registration. Cleared students may then register 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 students’ college for withdrawal for financial reasons.

University Tutoring Program
The University Tutoring Program is administered through the College Center for Academic Support. This 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 students 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 in 312 Lattimore. 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 the Center for Excellence in Teaching and Learning, 107 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, Rush Rhees Library, Room G-121, help students to examine their written work, correct problems, and make appropriate revisions.

Course Definition
The ordinary unit of undergraduate instruction is the course. Many courses numbered between 100 and 399 carry the equivalent of four hours of credit. Every four-hour course requires approximately one-fourth of the students’ working time for one term. Restrictions concerning prerequisites and approval 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 at the Academic Services Counter at 312 Lattimore.

Program of Courses
A normal schedule for regularly enrolled students in the College is four 4-credit courses per semester. This permits completion of the 32 courses (128 credit hours) 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; there is no additional charge for credits used for this purpose. Only students with a “B” average or better in one semester are permitted to take more than 19 credit hours during the next semester. This is referred to as an “overload.” First-year students are not permitted to take more than 3 credit hours over their four regular courses. For full-time students, fewer than 14 credit hours is termed an “underload,” and enrollment in at least 12 credit hours is required. Both overload and underload programs must be approved by the students’ dean, normally through the College Center for Academic Support.

If credits in excess of the normal 16-credit-hour course load are used for the purpose of accelerated graduation or completion of graduation requirements, a retroactive tuition adjustment will be assessed for those credits that count towards degree requirements. The assessment is generally made in the students’ final semester. Additional financial aid resources are not available.
Academic Services & Information

Class Attendance

Each instructor sets the regulations regarding attendance for each class; many do not make class attendance mandatory. Consistent absence from class, however, 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 who are seen at the University Health Service (UHS) for an illness or injury can ask for documentation that verifies the date of the students' visit(s) to UHS without mention of the reason for the visit. If the UHS determines the students should curtail activities in the coming days or weeks, the provider will give the students written instructions with specific recommendations.

Special Academic Opportunities

Students are encouraged to take courses for which they are qualified wherever the courses are offered at the University of Rochester to fulfill academic goals. Admission to certain courses requires special permission. Usually, this means permission of the instructor, whose permission code is needed, or whose signature is then required on the registration form. Special requirements must be met in the following instances:

Affiliated Area College Courses

In the College, 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 at the College Center for Academic Support. Grades received in approved courses are noted on the transcript, but are not used in computing the grade point average. Transfer credit is granted for courses passed with a grade of “C” or better.

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 does not appear on the transcript.

Graduate Courses

Qualified undergraduates may, with the written permission of the instructor and the approval of their dean on a drop/add form, register for graduate-level courses. (Graduate courses in the Simon School are normally not available to undergraduates.)

Honors Seminars

Special application is required in some cases. Courses and restrictions are listed in the schedule of courses.

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 College Center for Academic Support at the beginning of the semester. Students are eligible to apply for one 4-credit-hour independent study course each semester. Independent study courses required specifically for a major are listed under departmental offerings. Supervised Teaching and Internships provide other kinds of independent study.

Internships

In the College, 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 Hajim School of Engineering and Applied Sciences 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 students and the employer, in some cases, do become part of the interns’ academic record. Students receive information concerning these opportunities as they become available.

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College Course Numbering System

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>001–099</td>
<td>Noncredit courses*</td>
</tr>
<tr>
<td>100–199</td>
<td>Introductory courses—usually at the first- and second-year level; no graduate credit</td>
</tr>
<tr>
<td>200–299</td>
<td>Courses at the third- and fourth-year level that may also carry graduate credit</td>
</tr>
<tr>
<td>300</td>
<td>Study abroad</td>
</tr>
<tr>
<td>301–399</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-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>

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* 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.
Quest Courses
These courses, meant primarily for students in their first two years, are shaped by the practices of faculty learning. They embody a research-based pedagogy and exemplify research as a way of learning. Quest courses can be library-, data-, or laboratory-intensive and emphasize the skills that benefit the process of investigation. Freshmen, who have priority, are given the opportunity to register for fall courses during Orientation.

Study Abroad
Information about the various programs sponsored by the University of Rochester and about other opportunities for study abroad is available in the Center for Study Abroad and Interdepartmental Programs in Lattimore Hall.

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 may 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 students’ cumulative average. Further information and approval forms are available at the College Center for Academic Support.

Double Majors
Students enrolled in the College may choose to pursue two majors leading to the bachelor of arts degree. In most instances students may do so by fulfilling concurrently the requirements determined by each of the two departments, which would include the upper-level writing requirements for each major, and by receiving written permission from the respective major advisors to pursue a double major in the other area. Questions concerning double majors, including course overlap policies, can be addressed to the College Center for Academic Support and the appropriate major 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 plus an additional 8 credits and to receive approval for pursuit of these degrees from the Administrative Committee of the College. Students who wish to complete work in two areas as part of a single degree need only obtain approval for each major and for the double major (see Double Majors above). Students interested in pursuing a bachelor of music degree offered by the Eastman School of Music while also pursuing a bachelor of arts or bachelor of science degree offered by the College need to be accepted separately through each office of admissions.

Minors
Students may choose to minor in one or more of several dozen areas. Students are eligible to declare a minor after they have been accepted into a major and before the end of the first semester of their senior year. Course overlap policies apply.

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 online during registration or at 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 online or on a drop-add form that may be obtained from the Center for Academic Support until the deadline for the particular action, as described below.

Students in the College may add independent study courses through the third week, and other courses through the fourth week, with the instructor’s written approval. They may drop them and have them deleted from the record through the fourth week. Students may withdraw from courses through the last day of the 11th week of the semester, providing the instructor has been informed. For freshmen and sophomores who have not been formally accepted into a major, the authorization of the pre-major advisor is needed for every add, drop, or withdrawal action. Courses from which students have withdrawn will appear on their transcripts with the grade of “W.” The advising record will show in addition the week of the semester in which the course was withdrawn.

Students in the Hajim School of Engineering and Applied Sciences may add and/or drop a course during the first four weeks of each semester. The permission of the faculty advisor and the associate dean are required for add and drop transactions.

For all students, course changes can be made only if the deadlines are met, if the instructors of the added courses approve, and if the change meets the provisions outlined earlier for overload or underload schedules.

Student Petitions
The faculty of the College establishes all degree requirements. The faculty recognizes that there are instances in which interpretations are required and exceptions should be made. The Administrative Committee, comprising both faculty and students, reviews requests for exceptions to faculty regulations.

Students seeking exceptions to regulations submit a written petition to the College Center for Academic Support or their dean’s 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 are informed in writing of the committee’s action.
Satisfactory-Fail Option
Undergraduate students in the College are encouraged to venture outside areas of their major, 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.

Matriculated undergraduate students in the College 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. They may not elect this option for courses used to fulfill College, major, minor, or cluster requirements.

Instructors assign and submit regular letter grades for students choosing this option, as they 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 students’ 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 may declare the option by using the online form, or in the College Center for Academic Support, through the 11th week of classes (the same deadline as for withdrawing from courses), and except for first-semester freshmen and transfer students in their first semester who may change or declare the option through the 11th week of the semester, the option may not be changed. The option is not available in summer.

Students planning degrees from engineering and applied sciences should note that courses taken with the satisfactory-fail option may not be used to fulfill department requirements or cluster courses. These courses may be used to fulfill additional humanities or social sciences requirements or for free electives for an engineering degree. Otherwise, only courses taken beyond those required for a degree may be taken with the option.

Incompletes
A grade of “I” should be given only when there are circumstances beyond the students’ control, such as illness or personal emergency, that prevented the students from finishing the coursework on time. Under no circumstances may the “I” be given for the following situations:
- students who wish to do additional work after the course deadline to improve a grade
- students who wish to redo the coursework in a subsequent semester to improve the current grade.

A form requesting a grade of “Incomplete,” indicating the work outstanding and the deadline for its completion, must be signed by both the students and the instructor and submitted to the College Center for Academic Support. There is a one-semester limit for completion of the course, unless the College permits an extension. (Extensions are routinely granted when students are expected to complete their work by attending the course the next time it is offered, if the course is taught only once a year.)

Once a final grade has been submitted, whether passing or failing, the grade of “I” will be removed from the transcript. The grade of “I,” however, continues to appear on the advising record. The instructor may request a waiver of the recording of the “I” on the advising record when the lateness was created by circumstances unrelated to the students, such as equipment failure in a laboratory.

The students’ failure to submit the form or to complete the work by the deadline will result in an “E” for the course, unless the instructor noted on the form that a different grade should be assigned. The dean of the College shall inform the student of an impending action to change the “I” grade before notifying the registrar.

Repeating a Course for a Grade
There are times when students wish to demonstrate on their official record that they understand the material better than their grades indicate. Many complex issues are often involved, and students need to be sure that they have considered all of their options before making their decision to repeat a course. For these reasons, students who want to repeat a course need to secure the dean’s approval by meeting with a professional advisor in the Center for Academic Support. When a course is repeated at Rochester for a grade, both course registrations and both grades appear on the transcript, but only the second (not necessarily the better) grade is used to calculate the grade point average. Credit may be earned for a course only once.

Senior Year in Absentia
Students in the College expecting degrees in arts and sciences and who are admitted to a professional or graduate school at the end of their junior year may be eligible to spend their senior year in absentia. All college and major requirements should be completed by the end of the junior year. Those students considering a senior year in absentia should discuss the possibility in the College Center for Academic Support and petition the Administrative Committee for approval. If in absentia status is approved, the students earn a baccalaureate degree from the University of Rochester following successful completion of the first year in the graduate or professional program. Students who have spent their junior year abroad can not spend the senior year in absentia.

Because students’ most advanced work can be done in the senior year, students expecting degrees in engineering and applied sciences are not encouraged to take that year in absentia. 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 an advisor in the College Center for Academic Support or their school’s dean’s office.

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 “inactive” status in the College Center for
Academic Support or their school’s dean’s office. Those students who are placed on inactive status pay a nominal fee and receive registration 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 canceled upon receipt of a withdrawal notice from the appropriate advising offices. Withdrawn students have no further claim to their assigned space. Students who are officially reinstated and who wish to live in the residence halls must submit a new contract, and they are placed on a space-available basis. These conditions also apply to students in absentia, Study Abroad or in internship programs, 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 who withdraw or declare inactive status during the first 50 percent of the term or who change from full time to part time, tuition, room, board, and fees will be adjusted according to the schedule that is posted on the Bursar website: www.rochester.edu/adminfinance/bursar. 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.

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.

Adjustment of Financial Aid, Withdrawal, and Inactive Status
Financial aid is based upon the total cost of attendance at the University of Rochester. Adjustments to the cost of attendance due to a change of enrollment status (withdrawal or inactive) could potentially result in a reduction of previously awarded financial aid. The Financial Aid Office will determine the reduction in aid after the date of the change in status has been verified by the dean. Federal regulations require that this calculation be completed within 45 days of notification of the change of status.

Inactive students studying at another institution are not eligible for University funding. A Consortium/Contractual Agreement may allow students to receive a Federal Direct Loan, Federal Pell Grant, and, if attending another New York school, TAP funding. Students must have already completed their application for financial aid and a Consortium/Contractual Agreement before requesting their federal and state funding to be applied to another school’s charges.

Determination of Student Status
The University retains the right to determine the students’ status within the University. The University has discretionary powers to maintain students’ enrollment, to grant academic grades, to authorize graduation, or to confer any degrees or grant any certificates. Students concede to the University the right to require the students’ 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 the College is as follows:*:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Performance Level</th>
<th>Grade Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4.0</td>
</tr>
<tr>
<td>A−</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
<td>Above Average</td>
<td>3.0</td>
</tr>
<tr>
<td>B−</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Minimum Satisfactory Grade</td>
<td>2.3</td>
</tr>
<tr>
<td>C−</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>D+</td>
<td></td>
<td>1.3</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>1.0</td>
</tr>
<tr>
<td>D−</td>
<td>Minimum Passing Grade</td>
<td>0.7</td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>0.0</td>
</tr>
</tbody>
</table>

Grades that carry no grade points:

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Incomplete</td>
</tr>
<tr>
<td>W</td>
<td>Withdraw without effect on the grade point average</td>
</tr>
<tr>
<td>P</td>
<td>Pass (mandatory grading system in certain courses)</td>
</tr>
<tr>
<td>S</td>
<td>Satisfactory (Satisfactory-Fail option)</td>
</tr>
<tr>
<td>F</td>
<td>Failure (Satisfactory-Fail option)</td>
</tr>
</tbody>
</table>

Additionally, in the College, if the instructor in any course regards the written work of the students as deficient by reason of expository style, the grade will be so flagged on the final grade roster. This flag will not become part of the students’ permanent record.

Dean’s List
Following the close of the fall and spring semesters, a list is issued of those students whose academic achievement warrants notation on the Dean’s List.

An overall semester grade point average of 3.4 and completion of 16 or more credit hours, at least 12 of which have normal letter grades (A through E), with no “I” or “N” grades, are required for students to be named to the Dean’s List. (Seniors and students classified as Take Five or KEY need to complete successfully 12 or more credit hours with normal letter grades and no “I” or “N” grades.)

Part-time students can be named to the Dean’s List by achieving a 3.4 grade point average in the immediately preceding semester if they have also completed 16 credit hours with a grade point average of 3.4 during the preceding 24 months (including summer grades). At least 12 of the 16 hours must be completed.

* The Hajim School of Engineering and Applied Sciences does not give the grades of D+ and D−.
with normal letter grades, and the students must have no outstanding “I” or “N” grades.

**Probation and Separation**

The College regularly reviews the academic progress of registered students and acts 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 a major before achieving junior standing and, once accepted, a grade point average of at least 2.0 in the courses submitted for the major

Usually, the College warns students of impending difficulty by placing them 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 Athletics and Recreation (for students on intercollegiate teams), the Director of Minority Student Affairs (for underrepresented minority students), the International Services Office (for international students), and the Department of Naval Science (for students affiliated with the NROTC Program). Any students whose enrollment is continued will be considered in good academic standing.

The students’ dean 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.

**Grade Reports**

Students may view their grades online through UR ACCESS plus at any time. Information available to students includes courses taken, grades received, credit hours earned, and semester and cumulative grade point averages.

For University policy regarding reports to parents, see University Records.

**Academic Transcripts**

Official academic transcripts, which include a record of the students’ entire undergraduate program, are issued by the registrar’s office to other institutions or prospective employers at the students’ written request. The University reserves the right to withhold academic transcripts in the event of an outstanding balance owed the University.

**Bachelor’s Degree Cum Laude, Magna Cum Laude, and Summa Cum Laude**

The College recognizes outstanding College-wide achievement of its students by awarding these degrees. The dean assigns the levels of award, based on criteria established by the Steering Committee of the Faculty Council.

**Bachelor’s Degree with Distinction, High Distinction, and Highest Distinction**

The College recognizes quality of performance in a major by awarding the degree with “distinction,” “high distinction,” or “highest distinction.” Each department establishes its own criteria for the varying levels of distinction subject to the approval of the College Curriculum Committee and the Steering Committee of the Faculty Council.

**Bachelor’s Degree with Honors**

Certain departments in the College offer programs of study leading to the degree “with honors in research.” 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 in the course or courses in which the senior thesis or research project is completed. Specific course requirements for each major may be found in the appropriate departmental section in this bulletin.

**Academic Honesty**

As members of an academic community, students and faculty assume certain responsibilities. One of those responsibilities is to engage in honest communication. Academic dishonesty is a serious violation of the trust upon which an academic community depends.

A common form of academic dishonesty is plagiarism. This is the use, whether deliberate or unintentional, of an idea, phrase, or other materials from a source without proper acknowledgment of that source; the misrepresentation of sources; the improper use of course materials; the use of papers purchased online; submitting written work, such as laboratory reports, computer programs, or papers that have been copied from the work of other students. The risk of plagiarism can be avoided in written work by clearly indicating, either in footnotes or in the paper itself, the source of any major or unique idea or wording that the students did not arrive at on their own. Sources must be given regardless of whether the material is quoted directly or paraphrased.

Cheating provides a second example of academic dishonesty: using unauthorized notes or other study aids or unauthorized technology during an examination; looking at other students’ work during an exam or in an assignment where collaboration is not allowed; obtaining an examination prior to its administration; altering graded work and submitting it for re-grading; submitting work done in one class for credit in another without the instructor’s permission; undertaking any activity intended to obtain an unfair advantage over other students.

Students remain responsible for the academic honesty of work submitted in University of Rochester courses, even after the students have received a final course grade. This rule also applies to students who are no longer matriculated at the
University of Rochester, including those who have graduated. Ignorance of these standards will not be considered a valid excuse or defense.

**Orientation Honesty Policy Dissemination**

During Orientation in the College, students’ pre-major advisors introduce students to the nature of academic honesty in the College. At that time, they are handed a written version of the policy and a form acknowledging that they have received information about academic honesty. Signed acknowledgment forms will be collected by pre-major advisors. Transfer students receive their briefing on academic honesty from the College Center for Academic Support.

These Orientation procedures are designed to reinforce the importance of academic honesty.

All students (matriculated and nonmatriculated) enrolled in the College or in College courses must adhere to the College’s academic honesty policy, even if they do not attend Orientation or sign the acknowledgment form.

**Transferring within the University**

**The College**
First-year students are admitted directly into the College either to pursue a major in arts and sciences or in engineering and applied sciences and may freely change majors within these areas, provided they have completed, or can schedule, the appropriate prerequisites.

Students considering changing majors should seek assistance from their pre-major advisors and advisors in the College Center for Academic Support to help ensure that their first-year courses both explore potential majors and prepare them for each one which might be chosen.
Student Services

Office of the Dean of Students
Matthew Burns
  Dean of Students
Anne-Marie Algier
  Associate Dean of Students
Morgan Levy
  Assistant Dean of Students
Laura Ballou
  Director, Wilson Commons
Dawn Bruner
  Director, Parent Relations
Glen Cerosaletti
  Director, Rochester Center for Community Leadership
Kit Miller, Director
  MK Gandhi Institute for Nonviolence
Monica Smalls
  Director, Fraternity and Sorority Affairs

The Office of the Dean of Students provides programs and services that enhance student learning, promote community development, and support the educational goals of the undergraduate and graduate populations in the College. Through collaborative initiatives, the Office of the Dean of Students is dedicated to promoting a strong quality of life for students in both the academic and nonacademic realms. Areas of responsibility are described below.

Emergency Loan Program
The Office of the Dean of Students administers an Emergency Loan Program, which provides assistance to students for unexpected expenses. Undergraduate students may borrow up to $150, and graduate students may borrow up to $300.

For more information, visit the Office of the Dean of Students.

Center for Student Conflict Management
The Center for Student Conflict Management (CSCM) supports the University of Rochester community by addressing inappropriate student conduct and assisting students in developing conflict resolution skills.

Students experiencing a conflict can contact the CSCM to be connected with a staff member who listens to the students and discusses which of the conflict resolution processes available at the University of Rochester would be the most helpful in resolving the problem. If, after this conversation, the students decide that they would like to participate in a conflict resolution process, a specially trained facilitator is assigned to work through the process with them. Facilitators may be a staff member within the CSCM, or one of the over 30 trained facilitators from across the University. There are several conflict resolution processes offered by the CSCM, including mediation and restorative circles.

Students who may have engaged in inappropriate nonacademic behavior are often required to meet with a staff member in the CSCM to discuss the incident. Depending upon the circumstances of the incident, the issue may be able to be resolved in that initial meeting or it may require an additional 1:1 meeting, a hearing, or participation in an alternative dispute resolution process.

For more information, please visit the website at www.rochester.edu/college/cscm/.

Fraternity and Sorority Affairs (FSA)
The University of Rochester understands the role fraternities and sororities play in campus life with 23 percent of the student body being members of the fraternity and sorority community. Fraternity and Sorority Affairs (FSA) promotes excellence on campus and in the Greater Rochester area through support, advocacy, and advisement of fraternity and sorority members. The fraternities and sororities empower community through creating collaborative networks that are aligned with the mission and values of the College and the Office of the Dean of Students.

As educators, Fraternity and Sorority Affairs strengthens the relationship between the College and its recognized fraternities and sororities via a success-driven system rooted in the College. This strong, college-centered program represents efforts to create a framework based upon the College culture that encourages
the cultural values, expectations, and practices of fraternities and sororities consistent with the values and academic mission of the College.

Using the Communal Principles and the educational philosophy of the College, the University of Rochester developed the award-winning Expectations for Excellence program. This annual accreditation process for the fraternity and sorority community focuses on goal setting, program planning, and evaluation and guides the work coordinated by FSA with the 33 recognized chapters within the three governing councils, the Interfraternity Council, the Multicultural Greek Council, and the Panhellenic Association. Through the Expectations for Excellence as well as the leadership development and training programs provided to the fraternity/sorority community, FSA envisions that all fraternity and sorority members

- be integrated and invested in the College through active contributions to the quality of campus life
- serve as beacons of leadership for their communities
- exemplify and promote the positive aspects of fraternity and sorority life
- and be outstanding citizens and representatives of the University of Rochester.

For more information about Fraternity and Sorority Affairs and its award-winning community, visit www.rochester.edu/campus/fsa.

MK Gandhi Institute for Nonviolence

This nonprofit group works to realize the vision of the historic peacemaker by helping individuals and communities develop the inner resources and practical skills needed to achieve a nonviolent, sustainable, and just world. Located at the University of Rochester since 2007, the organization works with other groups and with students in the areas of nonviolence education and with hands-on community projects focused on restorative justice and sustainable living.

Parent Relations

Parent Relations, in collaboration with offices across the University, helps parents understand and support the student experience, learning, and growth. This office assists in orienting families to the University of Rochester and serves as a resource for parents throughout their students’ undergraduate career. The goal is to ensure that members of the University of Rochester parent community feel informed, valued, and respected.

Parent Relations publishes the UR Family Newsletter each semester. This newsletter updates parents and families on campus news and provides information about important on-campus student services. The UR Family Newsletter is mailed to students’ home addresses twice a year. In addition, Parent Relations works collaboratively with University Communications and the Parents Program to produce Parents Buzz, an e-newsletter for parents. Please visit the website at www.rochester.edu/parents or call (585) 275-5415 for more information.

Rochester Center for Community Leadership (RCCL)

Rochester students have historically been active citizens and leaders in both official and unofficial capacities. The Rochester Center for Community Leadership strives to educate students to become engaged citizens and leaders, capable of effecting positive social change in their communities.

Leadership Programs

Throughout the academic year the center offers unique leadership development opportunities for undergraduate students. The Skills for UR Leaders workshop series and Paychex Leadership Institute provide students with practical organizational skills and competencies. The center also sponsors a course, Leader to Leader, which examines the history, theory, and practice of leadership with guest appearances by local and national leaders in business, education, government, and politics. Each spring students are recognized for their contributions to the campus and Rochester communities through the Women’s Leadership Awards and Student Life Awards.

Community Service Opportunities

The center oversees various programs that enable students to connect with the community in ways that have a measurable impact for students as well as community partners.

Wilson Day

An annual orientation activity that engages new students in the life of the Rochester community through a day of service during the first week of college.

Urban Fellows Program

A paid summer internship program for area college students. The program immerses fellows in the life of the City of Rochester through on- and off-campus programs that engage them in current urban and community issues. Fellows work four days a week in community agencies and attend seminars on urban issues one day a week.

National Campaign for Political and Civic Engagement

Through the Center for Community Leadership, the University is an active participant in this consortium, which seeks to inspire undergraduate students to enter careers in politics and public service by involving them in community service, voter registration, and public service internships.

R World R Vote

This student-coordinated initiative encourages students to be politically engaged and active participants in the democratic process. Projects include voter registration, policy briefings, legislative action, and opportunities to meet with elected officials.

Monroe County Election Fellows

The Rochester Center for Community Leadership (RCCL), in partnership with the Monroe County Board of Elections and a consortium of area colleges, established the Monroe County Election Fellows Program to recruit, train, and retain college poll workers.
These fellows receive advanced technical, civic, and leadership training and design and implement strategies to recruit additional poll workers from their respective colleges.

Rochester Every Day
This discount program encourages students to get off campus and explore the city that is their home. By patronizing local businesses, students play a key role in fostering a vibrant business climate in the community.

Complete information about all of the center’s programs can be found online at www.rochester.edu/college/rccl.

Wilson Commons Student Activities
Wilson Commons Student Activities enhances the college experience and creates a diverse campus community by supporting over 225 student organizations. The office focuses on helping student leaders achieve their goals by encouraging them to explore and develop their interests and passions through experiential learning outside the classroom. The office provides information about all student organizations, provides resources to student organizations and the University of Rochester community, and assists students in forming new organizations. In addition, the office manages the University’s student union, Wilson Commons, and coordinates major traditional events of the College such as Yellowjacket Weekend, Boar’s Head Dinner, Winterfest, and Senior Week.

Student Government
The Students’ Association or SA, includes all undergraduates and is governed by a student-elected senate, president, and vice president. The senate and its over 75 funded organizations are supported by the student activities fee, which is assessed to all full-time undergraduate students. The SA has several standing committees including the Policy & Review Committee, the Projects & Services Committee, and the Students’ Association Appropriations Committee. The SA exists as a governing body designed to represent the students, to voice their concerns, and to make decisions that directly impact campus life.

Clubs and Organizations
Students can be involved in and attend events sponsored by a wide range of student organizations under the following categories: Academic Undergraduate Councils, Club Sports, Community Service, Cultural, Class Councils, Awareness, Entertainment Programming, Intercollegiate Competition, Performing and Fine Arts, Political, Preprofessional, Publications and Media, and Religious. Information regarding all student organizations, their officers, and their activities is found on Campus Club Connection at www.sa.rochester.edu/ccc. At the beginning of each semester, students can attend an Activities Fair that showcases the wide variety of student organizations on campus.

Residential Life
The Residential Life Program is designed to enhance students’ academic progress and opportunities for personal growth. As a comprehensive program, Residential Life provides undergraduate housing and programs; Special Interest Housing; ResTV; graduate/family housing; as well as off-campus housing listings and support services. If it has to do with where students live, it’s within the Residential Life mission. Visit Residential Life at www.rochester.edu/reslife for more information.

Dining Services
University Dining Services satisfies nutritional needs of students by serving outstanding, value-added meals. Unique, chef-inspired menus featuring international dishes, seasonal influences, and fresh ingredients add flavor to the dining choices. All active, full-time students must be enrolled in a meal plan.

Meal Plan Special Services
University of Rochester Dining Services makes every effort to accommodate students’ special dietary requirements and provide a selection of dining options including vegetarian, vegan, and kosher. Students with special dietary needs or food allergies can contact University of Rochester Dining Services at (585) 275-6265. For additional information, please visit www.rochester.campusdish.com or email RCDining@service.rochester.edu. On the website, find daily menus, hours of operation, contact information, important dates and forms, and much more!

Athletics and Recreation
The Department of Athletics and Recreation strives to provide vibrant, student-oriented programs that enhance the educational experience and recreational interests of the members of the University community. The department supports the educational mission of the College by providing high-quality instruction and facilities to attract the best students and provide them a meaningful athletic and recreational experience as a part of their overall development.

Twenty-two intercollegiate varsity programs offer a competitive Division III opportunity for 500 student-athletes. The intramural sports program features traditional competition and group fitness classes for over 3,500 participants. The diverse 35 club sports program accommodates approximately 1,000 students. More than 1,500 students, faculty/staff, and community members use the Goergen Athletic Center on a daily basis.

For additional information, call (585) 275-7643.

Gwen M. Greene Career and Internship Center
This nationally recognized facility is dedicated to providing state-of-the-art career planning, job search coaching, placement services, and academically linked career counseling that will lead students in the College successfully through and beyond their undergraduate years.

The Hyman J. V. Goldberg Career Library
The Goldberg Career Library is a comprehensive resource center for general career planning and researching specific internship...
and postbaccalaureate opportunities. Holdings include one of the nation’s best online and printed collections of careers and job-search publications, employer information, graduate school materials, and testing information. Through job-search workstations, students access web resources and use phone and fax capabilities to communicate with prospective employers and graduate schools and to network with alumni.

Pregraduation Student Employment Services
There are opportunities for students, regardless of demonstrated financial need, to work during their college years either in on-campus positions or for off-campus Rochester-area employers. From traditional jobs earning money for “living expenses” to truly preprofessional employment, Student Employment offerings emphasize the financial and experiential benefits of working within varied settings prior to graduation. All on-campus positions are posted and regularly updated on the Student Employment website accessed via www.rochester.edu/careercenter/seo.

Internet Resources
The center uses web-driven resources and instructs students how to maximize their use. Basic information about services and programs, as well as links to additional University and other sites, can be accessed via www.rochester.edu/careercenter. The center uses a state-of-the-art online database which allows students to register for on-campus recruiting, submit résumés for referral to internship and postgraduation employers, view postings, and link to employer websites. Rochester is one of a select number of institutions nationally that uses this tool. Also, the center’s career counseling services enable students to complete two of the most popular vocational assessment devices, the Strong Interest Inventory and Myers Briggs Type Indicator, online prior to individualized interpretation sessions.

Off-Campus Recruiting
Annually, the center hosts Career and Internship Connection events in New York City, Boston, Chicago, San Francisco, and Washington, D.C. These events blend the best of career fair and prescreened recruiting offerings, with Rochester students interacting with some of the most selective employers in each city. Each year hundreds of interviews for postbaccalaureate positions and internships are generated through the CIC events. Rochester students annually are selected for the most interviews by employers.

Reach Funding
Reach Funds are small stipends available to make unpaid summer internships more financially feasible. Students gain commitments from employers, then complete an application through the center during the spring semester. Funding is distributed on a first-come, first-served basis and is not guaranteed.

Postgraduate Professional and Graduate School Advising
For students planning to apply to graduate programs of study, advising and application process assistance is available through individual appointments as well as annual programs and workshops. The center also refers candidates to a web-based recommendation file service.

The center’s philosophy is to emphasize the importance of gaining experience and clarifying goals while still an undergraduate. These experiences include on-campus employment and research activities as well as internships. The Reach for Rochester program has, since 1986, facilitated more than 1,200 internship placements nationwide, netting close to $1 million in earnings for participating students and annual stipends in excess of $90,000.

The purpose of all programs of the center is to help students articulate their abilities in the language of prospective employers as well as postbaccalaureate graduate programs. The center recognizes that many first post-commencement positions are not directly related to the titles of particular majors, while it emphasizes a powerful confidence that Rochester students can and do succeed within a variety of pursuits. Employers regularly indicate that the most important traits a candidate can possess, especially among liberal arts graduates, may be the abilities to conduct research, analyze data, and present findings in verbal and written formats independently or as a member of a group. Employers express a desire to identify candidates who can create verbal and behavioral bridges from what they have done to what they can do. Creativity, curiosity, analytical skills, and the ability to articulate are exactly the qualities that University of Rochester students possess and project.

While many 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 receiving their bachelor’s degrees. Assistance in applying to professional and graduate school programs is available through the center and is complemented by the specific advising services previously described.

Minority Student Affairs
The Office of Minority Student Affairs focuses on enhancing the academic life of minority students. The office actively collaborates with University departments to promote student academic success and retention, and to ensure they successfully negotiate university life. The office’s 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.

The Office of Minority Student Affairs manages two programs for the College.

Early Connection Opportunity (ECO) Program
ECO is a pre-freshman summer residential orientation program designed to offer supplemental academic support in order to assist students in making a successful transition from high school to college. Participating students learn about the attitudes, skills, and social connections that characterize successful University of Rochester students. ECO prepares students for classes, informs them about resources and services available to them, and introduces them to social life on campus.
The Arthur O. Eve Higher Education Opportunity Program (HEOP)
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 and educational background, might not consider attending our University. HEOP staff coordinate a variety of academic support, counseling, and financial aid services to enable participating students to successfully complete a degree in 8 to 10 semesters. To be eligible for HEOP, students must be residents of New York State and meet specific academic and economic criteria.

The Office of Minority Student Affairs is located in 310 Morey Hall. For more information, feel free to contact the Office of Minority Affairs at (585) 275-0651 or via email at omsa@mail.rochester.edu. Also, please visit the website at www.rochester.edu/college/OMSA.

Interfaith Chapel
Distinguished by the diversity of its members, the College welcomes men and women from various faiths practiced by the world’s peoples. The Interfaith Chapel affirms and celebrates a rich mixture of religious expression and heritages by offering a variety of opportunities for religious worship and meditation, social service and personal counseling, and cultural and social events. Chaplains and advisors are available to work with all members of the University community. The director of the Interfaith Chapel 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.

While there are regular Catholic, Jewish, Muslim, and Protestant services run by chaplains, the Chaplain’s Office also helps identify advisors from other religious traditions to actively support and work with other groups. Students can call (585) 275-4321 to learn more about those options. Additional information can be found at www.rochester.edu/chapel.

International Services Office
The International Services Office (ISO) provides a full range of programs and services for approximately 1,700 international students and 500 scholars from over 90 countries who study and work at the University each year. The ISO administers under specific government regulations the F-1 and J-1 visa programs. The ISO staff issues immigration documents through the Student Exchange Visitor Information System (SEVIS) and provides advising on immigration regulations that affect internationals at the University.

The ISO acts as the University’s official liaison with the Department of State, foreign and American consulates, the Department of Homeland Security, and local government agencies. The ISO also works with members of the University community to advocate for and address various needs of international students and scholars.

The ISO also serves as an information resource to assist internationals in adjusting to the United States, the University, and the Rochester community. Other services and programs include a comprehensive website (www.iso.rochester.edu); an electronic newsletter; tax, travel, and employment workshops; and individual counseling to assist students in effectively coping with personal and cultural adjustment. In order to promote intercultural understanding, cultural, social, and educational programs are planned each year and cosponsored with campus and community groups, including the Rochester International Council. The ISO also offers a comprehensive international student orientation program each fall to welcome new arrivals and help orient them to the University.

Center for Excellence in Teaching and Learning
Academic effectiveness is a major concern of many students. The following services are offered by the Center for Excellence in Teaching and Learning to help students in the College improve academic performance.

Course-Specific Support
Students can participate in weekly peer-led workshops and study groups to improve problem-solving skills and become more confident when taking exams. These problem-solving group sessions are tailored for specific courses.

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. In concert with the Office of Minority Student Affairs, CETL also provides a study skills course in both the fall and spring semesters; this course is available to all students.

Disabilities
Students with disabilities can receive help in planning academic accommodations and developing strategies for meeting the demands of coursework.

Students seeking more information or wishing to make appointments may do so in person or by phone. The main office of the Center for Excellence in Teaching and Learning is located in 107 Lattimore Hall. (585) 275-9049. The website can be found at www.rochester.edu/college/cetl.

Students with Disabilities
The coordinator of the Office of Disability Resources works closely with resource coordinators in each school to review documentation of the existence of a disability and to make recommendations for reasonable classroom accommodations. The coordinator also works with the Office of Residential Life, Student Activities, and campus libraries to make arrangements for support services and needed resources. Classroom Accommodations,
University Health Service

Health Services

Primary health care is provided for all full-time University students on a prepaid basis through the Student Health Program. Medical care and health education services are provided by the University Health Service (UHS), and mental health services are provided by the University Counseling Center (UCC). Access to medical and mental health care is provided 24 hours a day, 7 days a week, throughout the calendar year.

Health Plan

All full-time students pay a mandatory health fee that entitles them to use the University Health Service (UHS) and the University Counseling Center (UCC) throughout the academic year and the following summer (September 1 to August 31), as long as they are enrolled on a full-time basis. The mandatory health fee covers visits to UHS primary care providers in the University Health Service (UHS), time-limited individual and couples therapy and yearlong group therapy with UCC mental health professionals, and health education services. In addition to the mandatory health fee, all full-time students must have health insurance. A University-sponsored health insurance plan is available through the University Health Service. This plan provides coverage for diagnostic laboratory tests and X-rays, surgical procedures, hospitalization, prescription medications, and other specific services not covered by the mandatory health fee. Students already covered by health insurance comparable to the University-sponsored plan can waive the fee for health insurance. All non-immigrant international students and their families who are in the United States with them must comply with INS requirements and University policies governing health insurance. A family insurance plan is available for students who wish to have coverage for themselves and their dependent child(ren).

Health Insurance Enrollment/Waiver Process

Each year, all full-time students must inform UHS about their health insurance coverage by completing the online Health Insurance Enrollment/Waiver Process. Students who do not complete this process will automatically be enrolled in the health insurance offered through the University Health Service. Students are financially responsible for fees not covered by their health insurance. Should a student choose to see a private physician or seek care outside UHS without the appropriate referrals, the student assumes responsibility (including financial responsibility) for the health care received.

University Health Service

The University Health Service (UHS) provides confidential, high-quality primary health care services for full-time University of Rochester students. The UHS clinical staff includes physicians who are specialists in internal medicine and family medicine, nurse practitioners, and registered nurses. To provide students with more personal and effective interaction, all students are assigned a primary care provider (PCP) at UHS. Students are encouraged to schedule appointments with their PCP.

UHS provides a full range of primary care services, including the treatment of illnesses and injuries, women’s health care, the management of ongoing medical problems, and care and advice for any health concerns. Health education programs and services are provided by the UHS Health Promotion Office.

Confidentiality

The relationship between UHS health care providers and their patients is confidential. UHS will not share information about the fact or nature of the students’ visit to UHS without the students’ permission. Notification of others, including parents, is considered the students’ responsibility unless the condition is serious and the students are unable to assume responsibility for informing others. Parental notification and consent will be obtained for students under age 18, as required by law.

Locations and Hours

For the convenience of students, UHS has offices on the River Campus, in the Medical Center, and at the Eastman School of Music. The River Campus Office is located in the UHS

Testing

The Testing Office administers national testing programs as noted below, as well as a variety of special exams.

Additional information about testing programs can be obtained in the Testing Office in 312 Lattimore Hall. The major testing programs administered by this office include:

- Graduate Record Examination (GRE)—subject only
- Law School Admission Test (LSAT)

Questions about other national testing programs should be directed to the Testing Office. If the tests in question are not offered there, students will be referred to the proper locations.

Writing Center Services

The College Writing Center offers a wide variety of writing support services for undergraduate students of all levels and in all disciplines. The office is staffed by graduate-student writing consultants and undergraduate writing fellows from the humanities, the social sciences, and the natural and applied sciences. Writing Center tutors provide individualized feedback and assistance on all types of academic writing. Students are welcomed to use the center’s services during any stage of the writing process, from brainstorming ideas to polishing a final draft. The College Writing Center is located on the ground floor of Rush Rhees Library, G-121. For more information about face-to-face and online tutoring services, please visit the website at http://writing.rochester.edu or call (585) 273-3577.

a Guide for Students with Disabilities, which describes the University’s disability accommodation policy and procedures, is distributed to all students who have accepted admission to the University and can be found at www.rochester.edu/ada/saccom.html. Anyone seeking further information about what resources are available should contact the Office of Disability Resources at (585) 275-9125.

Health Services

Primary health care is provided for all full-time University students on a prepaid basis through the Student Health Program. Medical care and health education services are provided by the University Health Service (UHS), and mental health services are provided by the University Counseling Center (UCC). Access to medical and mental health care is provided 24 hours a day, 7 days a week, throughout the calendar year.

Health Plan

All full-time students pay a mandatory health fee that entitles them to use the University Health Service (UHS) and the University Counseling Center (UCC) throughout the academic year and the following summer (September 1 to August 31), as long as they are enrolled on a full-time basis. The mandatory health fee covers visits to UHS primary care providers in the University Health Service (UHS), time-limited individual and couples therapy and yearlong group therapy with UCC mental health professionals, and health education services. In addition to the mandatory health fee, all full-time students must have health insurance. A University-sponsored health insurance plan is available through the University Health Service. This plan provides coverage for diagnostic laboratory tests and X-rays, surgical procedures, hospitalization, prescription medications, and other specific services not covered by the mandatory health fee. Students already covered by health insurance comparable to the University-sponsored plan can waive the fee for health insurance. All non-immigrant international students and their families who are in the United States with them must comply with INS requirements and University policies governing health insurance. A family insurance plan is available for students who wish to have coverage for themselves and their dependent child(ren).

Health Insurance Enrollment/Waiver Process

Each year, all full-time students must inform UHS about their health insurance coverage by completing the online Health Insurance Enrollment/Waiver Process. Students who do not complete this process will automatically be enrolled in the health insurance offered through the University Health Service. Students are financially responsible for fees not covered by their health insurance. Should a student choose to see a private physician or seek care outside UHS without the appropriate referrals, the student assumes responsibility (including financial responsibility) for the health care received.

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Locations and Hours

For the convenience of students, UHS has offices on the River Campus, in the Medical Center, and at the Eastman School of Music. The River Campus Office is located in the UHS
Student Services

Building, which is next to Susan B. Anthony Residence Halls. This office is open seven days a week during the academic year and on weekdays during school breaks and summers. The office in the Medical Center is open weekdays throughout the year. The Eastman School of Music office, located in the Eastman Student Living Center, is open weekdays during the academic year while classes are in session. The hours for the three UHS offices are listed on the UHS website (www.rochester.edu/uhs).

Scheduling an Appointment
Visits to UHS are by appointment at the UHS offices on the River Campus and in the Medical Center. Students should call the main appointment line at (585) 275-2662 to schedule an appointment. Students at the Eastman School of Music can walk in without an appointment to see the registered nurse. Visits with a physician or nurse practitioner at the Eastman office are by appointment.

When UHS Is Closed
UHS provides access to medical care 24 hours a day throughout the year. Whenever UHS offices are closed, a UHS physician is on call and available by phone for urgent concerns that cannot wait until UHS reopens. Unless it is a life-threatening emergency or a serious accident, students should call UHS at (585) 275-2662 before going elsewhere (e.g., the emergency department of a local hospital) for care. In an emergency, students should call Security at x13 or (585) 275-3333 for immediate assistance.

Health History Forms/Immunization Requirements.
All entering matriculated full-time and part-time students must submit the Health History Form, which includes the students’ record of immunizations, prior to the start of classes. New York State law requires all students to provide proof of immunity to measles, mumps, and rubella. Students who fail to comply with the requirements may be withdrawn from the University. Students with questions can contact UHS at hhf@uhs.rochester.edu or (585) 275-0697.

Health Education
The UHS Health Promotion Office promotes the wellness of the University community by providing educational programs and activities that encourage the development of a healthy lifestyle and the effective use of health care services. The office provides opportunities for students to become involved in promoting health on campus. Students interested in getting involved and/or wanting to schedule a program are asked to call (585) 273-5775.

UHS Website
Located at www.rochester.edu/uhs, the UHS website offers complete information about UHS services, hours, locations, health insurance, announcements, and more. Information on a wide variety of health topics and links to reputable sites are also available on the UHS website.

University Counseling Center
The University Counseling Center (UCC) offers time-limited individual and couples therapy and yearlong group therapy to all students through the mandatory student health fee. UCC therapists have experience in assisting students with a variety of concerns such as anxiety, apprehension about major life decisions, depression, relationship difficulties, family problems, eating concerns, sexual functioning, sexual identity, roommate hassles, and general discomfort about what is happening in the students’ life. UCC also offers a variety of therapy groups on topics such as adult children of alcoholics, survivors of sexual abuse, eating disorders, bereavement, and relationship issues.

Confidentiality
All contacts with a UCC therapist are confidential. The fact that students are using UCC is not disclosed to any University official or faculty member, or to family, friends, or roommates without permission of the students. Because of the sensitive nature of visits, extreme care is taken to protect the confidentiality of patients’ records. UCC records are separate from UHS medical charts and from Strong Memorial Hospital records.

Locations and Hours
UCC is located on the third floor in the University Health Service Building on the River Campus. UCC also has an office in the Eastman Student Living Center at the Eastman School of Music. The office on the River Campus is open weekdays all year. The Eastman School office is open part time during the academic year, while classes are in session. The hours are listed on the UCC website. Appointments for any UCC office can be scheduled by calling (585) 275-3113.

After-Hours Care
A mental health professional is on call and available 24 hours a day throughout the year to deal with urgent situations and can be reached at (585) 275-3113 any time of the day or night.

UCC Website
Located at www.rochester.edu/ucc, the UCC website provides information about the services provided and links the readers to other online health care sites. In addition, mental health questions can be addressed to the UCC online resource “Dear Dr. Ana-Lyze.” This site is to be used strictly as an educational tool and in no way attempts to replace formal therapy.

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 by the University’s tuition and other educational income.
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 limited. Monday through Friday from 7:30 a.m. to 7 p.m. on-campus parking for students, employees, and visitors is by permit. 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 (no freshman parking). 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 providing service from the more distant lots to the campus run various times 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 7:30 a.m. weekdays, and at any time on weekends and 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 Boulevard near Elmwood Avenue.

Wilson Boulevard is a city park road at the edge of the River Campus. Parking on Wilson Boulevard is limited to short-term meters and is not intended for student use.

More information on parking guidelines and shuttle bus schedules may be found on the University’s web page at www.rochester.edu/parking.

Bicycles, Mopeds, Motorcycles, and Scooters
In all but the snowiest of seasons, bikes are a convenient and popular means of getting between University buildings and to nearby shopping areas. Parking permits are required for motorcycles. Parking permits are not required for bicycles. Their use is subject to University regulations. Generally speaking, these vehicles are not permitted in University buildings and may not be locked to trees, lamp standards, railings, or the like.

Intercampus and Public Bus Services
First Transit provides free scheduled shuttle bus service to members of the University community with a University ID 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 School of Music Living Center, and stops at selected points along the route.

Regional Transit Service (RTS) will continue to provide regular, full-fare, scheduled service between downtown Rochester and University facilities.

Banking Services
Branches of JPMorgan Chase Bank are located on the River Campus in Todd Union and at the Medical Center. Each provides full service banking. Check cashing is provided for students who have JPMorgan Chase accounts. Such service also may be provided, up to a $100 maximum, at nominal charge for others with a University identification card. Additionally, ATMs are located throughout the campuses.

ATMs are located throughout River Campus. The ATMs are as follows: JPMorgan Chase Bank in Todd Union and Rush Rhees Library Road, HSBC Bank in Wilson Commons, and Advantage Federal Credit Union in Susan B. Anthony Halls.

ATMs are also located throughout the Medical Center. The ATMs are as follows: JPMorgan Chase Bank at 260 Crittenden Blvd. entrance and SMH lobby, and Advantage Federal Credit Union at north corridor entrance to Kornberg Atrium and Crittenden Blvd. loop entrance.

Campus Post Office
The Campus Post Office is a privately run station of the United States Postal Service that is staffed by University personnel. The USPS contracts the University to sell postage and money orders, and handle special service mail such as Express, Certified, Registered, and Insured. Another postal service office is located in the University Medical Center.

In order to receive mail and packages on campus, students must have their own post office box. Private carrier companies (UPS, Fed Ex, RPS, Airborne, etc.) can be shipped directly to the students’ CPU box; packages of any size cannot be sent to individual residence hall rooms. Incoming freshmen will automatically be assigned a CPU box number at orientation. Mail is delivered to students Monday through Friday, except on University holidays.

When students receive a package or piece of special service mail, they are notified by email. The USPS does not deliver mail to the University on Saturdays or Federal holidays, except for Express Overnight deliveries. By taking advantage of the intramural mail system, students can send mail to any University location, postage free.

For a nominal fee, students can send or receive faxes at the Campus Post Office, as well as sending packages via UPS or Federal Express. A variety of packaging supplies are also available for purchase.

The box fee for an undergraduate student is $40 for the period July 1 through June 30.

Student Identification Cards
The University provides identification cards for all students. They are required for checking out books from the library, cashing checks on campus, and may be required for admission to various campus events, certain facilities, and activities. The card displays students’ name, an identifying color bar for campus affiliation, and photo. Students at the Medical Center are required to wear identification badges while in the Medical Center. The ID card satisfies hospital code and accreditation requirements for hospital identification. ID cards include a magnetic stripe and a bar code, which serve as keys for authorized admission to residence halls, laboratories, and other areas secured by access card readers. The ID card is required by students to make purchases from their Dining Plan contracts, vending machines, and campus convenience stores. In addition, the student ID card is the principal means for identification on campus and it is useful for positive identification elsewhere.
Entering first-year students are photographed during Freshman Orientation and keep their cards through their senior years. Transfer students are photographed early in the fall and spring terms. No charge is made for the initial identification card, but there is a fee for replacement of a lost card. Worn or damaged ID cards may be turned in for a free replacement. Upon turning 21, students may go to an ID Card Office and exchange an “Under 21” ID card, to include an updated photo and a change in the age designation field to “21 or Over.” There’s no charge for this service.

University Intercessors Office
Intercessors provide a resource for solving problems that have not been addressed elsewhere in the University. Students, staff, or faculty members who have concerns about their University experience that cannot be worked out through obvious channels are encouraged to contact the intercessors office for assistance. This office is 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 environment. Intercessors are able to address concerns regarding sexual harassment, racial harassment, and discrimination on the basis of gender, disability, and age. The intercessors office can be reached by phone at (585) 275-9125, 275-5931, and (585) 275-4354 (Medical Center).

Security Services
Campus Crime Statistics
In October of each year, University Security Services and Environmental Health and Safety provide to all students and staff the latest security and fire safety annual reports, incorporated in one document called Think Safe. It contains campus security, fire safety, emergency notifications, and personal safety information.

Topics include crime prevention, Security Services authority, fire and crime reporting policies, disciplinary procedures, and other matters of importance related to security and fire safety on campus. Think Safe contains crime statistics for the three previous calendar years concerning reported crimes that occurred on campus, and in certain off-campus buildings or property owned or controlled by the University, and on public property within, or immediately adjacent to, and accessible from the campus. Fire statistics are included for on-campus student housing areas. Statistics are reported to the U.S. Department of Education (USDoED) and are available on their website at http://ope.ed.gov/security/ and on the University’s site at www.security.rochester.edu. You can obtain a hard copy of Think Safe by contacting University Security Services at (585) 275-3340 or Environmental Health and Safety at (585) 275-3241. University Security services are available 24 hours/day, 7 days/week by calling 2333 from any campus phone or by dialing 113 for emergencies. In addition, AT&T and Verizon customers may make a free call to our emergency Communications Center by pressing #413 from their cell phone while in the Rochester area. We are in immediate contact with local police, fire departments, and emergency medical resources.

University Information Technology
The staff of University Information Technology provides IT services and support to enhance students’ education. Students at the University of Rochester have access to

- a high-speed data network accessible from residence halls and across campus
- University-authenticated wireless that is available at many residence halls and academic and public locations around campus (visit www.rochester.edu/it/wireless)
- information about a wide range of University-wide collaborative security measures, including student security awareness campaigns and “Security Tips of the Week”: www.rochester.edu/it/security
- a large IT Center with an IT Help Desk to answer questions about various technologies and applications
- a University Account (visit http://myidentity.rochester.edu), which is a private key to the University web portal my.rochester.edu and a variety of other online services, including email, the wireless network, printing, access to public computing facilities, online course registration, online voting, and more
- several computer labs equipped with modern technology to help complete assignments
- competitive long-distance rates and discounted cellular phone service
- two onsite computer stores that offer educational discounts on computers, hardware, software, computer accessories, popular consumer electronics, and other related information technologies (visit www.rochester.edu/it/css)

Students living in residence halls are provided with high-speed data network connections. On-campus digital telephone service, including free local calling and voicemail service, can be requested, and 24-hour, on-campus directory service is available. For more information about enhanced voicemail, analog adapters, ADA-compliant services, or TDD equipment, please contact the IT Center at (585) 275-2000 or univithelp@rochester.edu.

The University’s website, www.rochester.edu, is a rich resource of detailed information. If not sure how to find the information needed, there is a “Search” function located at the bottom right of the home page.
Admissions

Undergraduate Admission

The University of Rochester welcomes self-directed students who demand the freedom to study what they love. These students appreciate the opportunities available through a major research university, yet want the personalization of a smaller school.

Undergraduates are admitted as freshmen or as transfer students for full-time or part-time study. To obtain additional information, download application forms, and to schedule campus visits and interviews, visit www.enrollment.rochester.edu/admissions or contact the Office of Admissions at University of Rochester, Office of Admissions, P.O. Box 270251, Rochester, NY 14627-0251, or by calling (585) 275-3221 or (888) 822-2256.

Individual attention is given to all students from the time they first become interested in the University. A staff of counselors and many faculty members participate in the advising of applicants and review of applications. Admission decisions are based on students’ high school work, recommendations from instructors and counselors, participation and leadership in school and community life, verbal and analytical skills, outstanding achievements and talents, unique contributions to the residential college environment, and for transfer students, college coursework already completed.

Admissions interviews are recommended for prospective students. Applicants to the University should schedule an interview with an admissions counselor or alumni volunteer by visiting www.enrollment.rochester.edu/admissions.

For admission procedures for the School of Nursing, please call (585) 275-2375 or visit www.son.rochester.edu.

Recommended Preparation for Admission

The University does not expect a specific minimum for high school or college grades or test scores. Students who can grow and learn through Rochester’s academic programs and opportunities do not fit one particular mold, and grades and test scores are not the only indicators of potential success. Therefore, students are evaluated in terms of their individual accomplishments. Rochester requires a secondary school report with recommendation(s) and a transcript showing commitment and achievement. Most applicants complete at least 32 semester units in academic coursework, chiefly English, mathematics, social sciences, laboratory sciences, and foreign languages. Honors, Advanced Placement, or International Baccalaureate courses are expected of students in secondary schools offering these programs.

Current licensure as a registered nurse or a prior baccalaureate degree in a non-nursing field is an admission requirement for all School of Nursing programs.

Visits to the University

The Office of Admissions welcomes families for information sessions, interviews, and campus tours on most weekdays throughout the year, including many holidays. Some weekend options are offered during the spring, summer, and fall.

Prospective students and their families who visit campus find their interactions with counselors, current students, and faculty prove invaluable. Admissions can arrange overnight accommodations on campus for prospective students. Requests to visit campus or to stay overnight should be made at least two weeks in advance.

Students with questions concerning academic departments, student life, or extracurricular activities may contact Admissions or inquire via email at admit@admissions.rochester.edu. Applicants who cannot travel to Rochester may wish to speak with an alumni representative in their area. To schedule an interview, visit www.enrollment.rochester.edu/admissions/events/offcampus/.

For information on visiting the School of Nursing, please contact the school’s Student Affairs Office.

Travel Information

Rochester is served by many major airlines. The campus can be reached by taxicab from the Greater Rochester International
Airports (GRIA) in approximately 10 minutes. The Greyhound and Trailways bus terminal is within walking distance of East Main Street, 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 trains.

The University’s main campus, the River Campus, is located on Wilson Boulevard at Elmwood Avenue.

Applying to Rochester

Students may apply to enter Rochester for either the fall or spring semester. Applications should be submitted by October 1 for spring consideration and January 1 for fall. Prospective freshmen wanting an early decision for the following fall should see the instructions below.

The following materials are required before the application review can begin: the Common Application (www.commonapp.org); an official high school transcript showing at least three years of grades; official SAT or ACT scores; the Rochester Application for Freshmen/Transfer; letter of recommendation from a teacher or guidance counselor. Applicants are invited to submit additional instructor recommendations and other materials which may be useful in the application review.

Prospective nursing students should request nursing application forms from the Office of Student Affairs, School of Nursing, Box SON, 601 Elmwood Avenue, Rochester, NY 14642. Admission requirements and application forms for the School of Nursing differ from those of the College.

College Entrance Examinations

Applicants for admission are required to take either the Scholastic Assessment Test (SAT Reasoning) of the College Entrance Examination Board (CEEB) 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 SAT Subject Tests and junior-year Advanced Placement (AP) and International Baccalaureate (IB) exams are recommended but not required.

Applicants for fall admission should take the SAT or the ACT by January of the final year in secondary school. Applicants whose native language is not English are required to submit scores from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS).

If applying for Early Decision; academic merit scholarships; Combined-Admission Programs (CAPS) in medicine, business, engineering, or education; or spring admission, applicants should take the SAT or the ACT by October. The University of Rochester code is 2928 for the SAT and TOEFL, and 2980 for the ACT.

Early Decision

Students who decide that Rochester is their first-choice college may apply for an Early Decision on their applications. If admitted, Early Decision candidates agree to withdraw all other applications and enroll at Rochester.

If the application is completed by November 1, candidates are notified of the admission decision by December 15. Please note that Early Decision candidates should take the SAT I or ACT by October.

If Rochester is the students’ first-choice college, it is to the students’ advantage to apply for Early Decision. Those applicants not admitted Early Decision may be reviewed again as regular decision applicants.

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 by April 1. For fall regular decision admission, Rochester subscribes to the uniform Candidates’ Reply Date, whereby admitted students are not required to notify the University of their decision until May 1.

By that date, students who accept the offer of admission submit a nonrefundable enrollment deposit of $700 or more. The deposit is deducted from the first tuition bill after the start of classes.

Admission decision times for the School of Nursing vary by program.

Merit Awards

Merit-based scholarships are invested, without regard for students’/families’ financial circumstances, in students who demonstrate outstanding academic achievement and potential. Applicants to the University of Rochester are considered for merit scholarships when they apply for admission to the College (School of Arts and Sciences, Edmund A. Hajim School of Engineering and Applied Sciences). Some scholarships require applicants to submit additional documents. All applicants desiring merit-based awards should schedule an admission interview.

The following is a partial list of the merit awards offered at the University of Rochester:

- Ahora Scholarship
- Bausch & Lomb Honorary Science Award
- College Bound
- Dean’s Scholarship
- FIRST Robotics Scholarship
- Frederick Douglass and Susan B. Anthony Humanities Award
- Geneseo Scholarship
- George Eastman Young Leaders Award
- Harper Scholarship (Martha Matilda Harper)
- Hillside-Rochester Scholarship
- IB Scholarship
- Jackie Robinson Foundation Scholarship
- Lorenzo de Zavala Scholarship
- Meliora Alumni Scholarship
- National Achievement Scholarship
- National Hispanic Scholarship
- National Merit Scholarship
- Navy ROTC Scholarship
Undergraduate Admission

- Renaissance Scholarship
- Rochester International Scholarship
- Rochester Pledge for Veterans
- Rochester Promise Scholarship
- Rochester Rotary Oratorical Scholarship
- Rochester Ventures Scholarship
- Rush Rhees Scholarship
- STEP
- 7th Generation Scholarship
- Urban League Scholarship
- Washington Metro Scholarship
- The Wilder Trustee Scholarship
- Rochester Promise Scholarship
- Youth Orchestra Scholarship

For more detailed information about merit awards at Rochester, please visit http://enrollment.rochester.edu/financial/undergrads/scholarships.shtm.

Engineering and Applied Sciences

Prospective students interested in exploring any of the degree programs in engineering and applied sciences should indicate this interest on their applications. Because of the structured programs that are typical in engineering and applied sciences, it is essential for prospective majors to consult with faculty in choosing courses and sequences. These students are assigned faculty advisors from the Edmund A. Hajim School of Engineering and Applied Sciences at the beginning of their first year.

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 offers, in cooperation with the Eastman School of Music, the bachelor of arts (BA) degree with a major in music (see page 186). This liberal arts program, based on the River Campus, includes a combination of academic study, private instruction, and ensemble experience. Although the major is a demanding one (students usually take between one-third and one-half of their courses in music), many music majors also explore beyond the introductory level in one or more nonmusic disciplines, sometimes as a double major. Private instruction on instruments and voice is available to all College students who have sufficient musical preparation to earn collegiate credit for lessons. The required auditions for lessons are arranged through the Department of Music in the College, 207 Todd Union, (585) 275-2828.

The University’s Eastman School of Music offers the bachelor of music (BM) degree in applied music, jazz studies and contemporary media (performance and writing skills), music composition, music theory, music education, and musical arts. Students in these degree programs pursue intensive studies in music performance and academic music subjects comprising approximately three-fourths of the program with the remainder devoted to study in the humanities as well as elective courses. Admission is by audition and is highly selective. The Eastman School is located in downtown Rochester and Eastman students are housed in the Student Living Center across the street from the school. Information on how to apply for a bachelor of music degree at the Eastman School of Music is available on the website: www.esm.rochester.edu/apply/. The application deadline for the Eastman School of Music is December 1.

Undergraduate Dual Degree Study

A dual degree program, offering study in the BA or BS degree from the College (School of Arts and Sciences, Hajim School of Engineering and Applied Sciences) in addition to the BM degree from the Eastman School of Music, is available to qualified applicants. The fact that Eastman is a professional school within the University of Rochester makes such combined degree programs possible. Interested students must complete two separate application processes. Admission to the College and Eastman may be based on different criteria and require different application deadlines. Financial aid at the two schools is based on different criteria and policies. This autonomy of admission processes gives each school the latitude to enroll its ideal students.

Once applicants are successfully admitted to Eastman and to the College, they are considered dual degree students of the University. Advisors on each campus are assigned to these students to coordinate the two degree programs. While completing two degrees at the same time can be extremely challenging, about 10–15 students each year choose to pursue this option. For more information, see www.esm.rochester.edu/degrees/dd_ugrad.php.

School of Nursing—Admission

All students admitted to the School of Nursing must hold current licensure as a registered nurse or a prior baccalaureate degree in a non-nursing field. The curriculum is responsive to adult learners, and this is the focus of the baccalaureate program. The School of Nursing has 3+1 agreements with area community colleges for students who need a basic program to become licensed as a registered nurse; the baccalaureate coursework is then completed at the University of Rochester.

Applicants should contact the Office of Student Affairs at (585) 275-2175 or visit the website at www.son.rochester.edu for program deadlines and further information.

Accelerated Programs for Non-Nurses

The one-year Accelerated Baccalaureate Program for Non-Nurses (ABPNN) and three-year Accelerated Master’s Program for Non-Nurses (AMPNN) require a prior BA or BS in a non-nursing field, transcripts, a 3.0 GPA preferred, two letters of reference, a professional statement, and students may be invited for an interview. Anatomy and physiology, microbiology, developmental psychology, nutrition, and statistics (minimum grade of C for all) are prerequisite to the program. At the completion of the one-year generalist curriculum, the bachelor of science
degree is awarded and students are eligible for professional registered licensing examinations. A minimum of 49 credits must be completed through the University of Rochester School of Nursing for the ABPNN. The Accelerated Master’s Program provides education for generalist and specialist (advanced practice) nursing roles and awards the BS and MS degrees. Students are eligible for professional registered licensing examinations and nurse practitioner certification. Students are accepted to a nurse practitioner specialty upon admission to the AMPNN program.

RN to BS Program
For the RN to BS Program (baccalaureate completion program for registered nurses from an associate’s or diploma program), a 3.0 GPA is preferred. Nursing license/registration is required. Transcripts, two letters of reference, and a professional statement/short essay are also required.

RN to BS to MS Program
The RN to BS to MS program is an accelerated program for select registered nurses with defined career goals who desire a master’s degree. Applicants have the same admission requirements as master’s applicants, with the exception of a BS in nursing; RN licensure/registration, two favorable references, a professional statement, and a statistics course (grade C or above). Applicants must declare a specialty area. An interview may be required.

The BS degree is 128 credits. All arts and sciences courses may be transferred in, or challenge examinations are possible. Upon matriculation, 32 nursing credits are awarded automatically for completion of an accredited diploma or associate degree nursing program. A minimum of 32 credits must be completed through the University of Rochester School of Nursing.

Rochester Early Medical Scholars Program (REMS)
REMS is an eight-year BA/BS-MD program for exceptionally talented undergraduates. Students enrolled in this program enter the University of Rochester with an assurance of admission to the University’s School of Medicine and Dentistry when they successfully complete their undergraduate degree programs, including GPA and premedical requirements. REMS enrollees work closely with faculty mentors and participate in special seminars and events.

Successful REMS candidates possess a demonstrated interest in medicine and have a superior secondary school record, standardized test scores, and recommendations. In addition, REMS applicants must complete the regular undergraduate admission application (or the Common Application and its supplement) and the special Combined-Admission Programs (CAPS) Application by December 1. Information about the REMS program may be obtained by contacting the REMS Program Coordinator in the Office of Admissions.

Graduate Engineering at Rochester (GEAR)
The GEAR program provides selected students with a guarantee of admission into one of the engineering master’s programs at the University of Rochester’s Edmund A. Hajim School of Engineering and Applied Sciences: biomedical engineering, chemical engineering (alternative energy is offered within the chemical engineering department), computer science, electrical and computer engineering, materials science, mechanical engineering, or optics. GEAR students receive a 75 percent tuition award (50 percent for optics) in their fifth year of study and may be asked to act as teaching assistants. To remain eligible, GEAR students are required to maintain a 3.3 GPA (both cumulative and within the major) after first semester freshman year (3.5 for optics). Applicants for this program will have demonstrated strong aptitude for engineering throughout their high school academic and co-curricular activities.

Guaranteed Rochester Accelerated Degree in Education (GRADE)
A five-year BA/BS+MS in education program for students admitted to the University of Rochester who are interested in becoming educators. GRADE students enter the University with an assurance of admission to the Margaret Warner Graduate School of Education and Human Development with the Steven Harrison quarter-tuition scholarship for all five years. The program is designed to offer students a quality liberal arts education while also preparing them to become educators.

International Students
The University of Rochester values the diversity of a multicultural campus and encourages international students to apply. The University is able to offer merit-based scholarships annually to highly qualified applicants. International applicants are required to submit the same application materials and take the same entrance tests as U.S. citizens, but will also need to provide proof of financial support.

Because SAT and ACT exams are administered less frequently abroad, and scores take longer to be reported, students are advised to contact the American College Testing Program or the College Entrance Examination Board as soon as they decide to apply to the University. The SAT or ACT should be taken no later than December for fall admission consideration. Because it is often challenging to interpret and evaluate secondary school transcripts from abroad, translations and explanations of grading systems should be submitted. 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. All correspondence and applications should be sent by air mail or fax at (585) 461-4595.

Application forms for the SAT may be obtained from secondary schools or the College Entrance Examination Board, P.O. Box 592, Princeton, New Jersey 08540. Application forms for the ACT can be obtained through secondary schools or by writing to the American College Testing Program, P.O. Box 168, Iowa City, Iowa 52240.

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.

For questions about undergraduate international admission to Rochester, please contact the Office of Admissions at admit@admissions.rochester.edu.

All RN applicants intending to earn their baccalaureate degree from the School of Nursing should contact the Commission on Graduates of Foreign Nursing Schools (CGFNS) for information on obtaining a U.S. registered nurse license (www.cgfns.org).

**College Credit for Prior Coursework**

The University prefers that its entering freshmen take all their courses from Rochester faculty. With the exception of Advanced Placement and International Baccalaureate work, the University normally does not grant college credit for secondary school coursework nor for courses taught in a secondary school by its own faculty for college credit.

Credit may be granted for prior coursework completed with grades of C or better at an accredited college or university. Upon receipt of an official transcript and course descriptions from the college where the student was enrolled, the coursework will be evaluated to determine if it is equivalent to coursework offered through the College at the University of Rochester. Students wishing to receive credit for such college work, or who are now considering taking college courses elsewhere, should ask the College Center for Academic Support, (585) 275-2354, for advice about credit transfer and/or selection of courses.

For students in the School of Nursing, course transfer questions should be directed to the Office of Student Affairs, (585) 275-2375.

**Advanced Placement and International Baccalaureate Credit**

Entering students may receive course credit and/or higher-level course placement at Rochester through the CEEB Advanced Placement Program. Advanced Placement score reports must be forwarded to the College from the CEEB. Rochester also awards credit for satisfactory scores on the International Baccalaureate (IB) higher level examinations. As soon as these reports are received and reviewed, enrolled students are notified about placement or course credit. This information is used in course selection during Freshman Orientation. Specific questions may be addressed to the College Center for Academic Support, 312 Lattimore Hall, P.O. Box 270402, Rochester, NY 14627. Phone: (585) 275-2354.

**Transfer Admission**

The University of Rochester encourages students who have begun their academic careers at other colleges or universities to continue their educations here on either a full-time or part-time basis. Ordinarily, students who have previously enrolled for at least one semester of full-time study or who have completed a minimum of 8 credit hours at another college after graduation from high school are eligible to apply for transfer admission. Students undertaking college-level coursework as part of their high school programs, or in order to satisfy high school diploma requirements, are eligible to enter as freshmen, although they are welcome to request academic credit for their college work.

**Application Procedure**

Transfer students may apply for admission to either the fall or spring semester. The recommended deadline for fall consideration is June 1, and for spring, November 1. It is to the students’ advantage to complete an application well in advance of the semester for which they are applying. This is especially true if the students are requesting financial aid and/or on-campus housing.

The School of Nursing does not accept undergraduate transfer students. Students must have a prior associate’s degree in nursing or a prior non-nursing baccalaureate.

**Application Materials**

In addition to the transfer Common Application, applicants are required to submit Rochester’s Application Supplement for Transfers, all official college transcripts, and at least one letter of recommendation, preferably from a professor. Applicants who have not completed a year of college are also required to submit high school materials. These include secondary school report, final high school transcript, recommendation from guidance counselor, and official SAT Reasoning or ACT score report(s).

International student applicants who have studied at least a year within the United States are to follow the same application requirements as other applicants. If student applicants have studied outside of the United States, they are required to submit all documents listed above (officially translated, if the originals are not in English) and some additional requirements. Those additional requirements are World Education Services (WES) course-by-course credit evaluation, college course descriptions, and English proficiency scores from Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS). All applicants who are not U.S. permanent residents must also submit an International Financial Support Form to be considered for admission.

**Academic Review**

Emphasis is placed on the most recent coursework completed at the college level; it is reviewed to determine if students are academically prepared to pursue a degree at the University. Applications from candidates who could enter with more than four semesters of transfer credit are generally reviewed by the department in which a major is planned. A maximum of 64 credit hours is transferrable to the University of Rochester degree. After reviewing an application, the Committee on Admissions notifies the candidates of its decision soon after the application is completed.

**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 grades of C or better, will transfer for curriculum requirements or for elective credit. When transfer students apply for a major, the department will designate which transferable courses may be applied toward its requirements.

Residency Requirement
The College requires that students complete a minimum of four semesters of full-time study in residence or, for part-time students, the equivalent number of credit hours to be eligible for the bachelor’s degree. Coursework taken at the University prior to admission as a matriculated student does not count toward the residency requirement.

Transfer students are expected to fulfill all requirements set by the College. The School of Nursing programs for RNs require a minimum of 32 nursing credits taken at the University of Rochester. The School of Nursing Accelerated Programs for Non-Nurses require a minimum of 49 nursing credits.

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.

Campus Visits
Students who are considering transfer are urged to visit the campus to become familiar with the University community and to obtain answers to their questions about Rochester. Requests for application materials and campus visits should be directed to the University of Rochester, Office of Admissions, P.O. Box 270251, Rochester, NY 14627-0251, telephone (585) 275-3221 or (888) 822-2256. Students who bring copies of their transcripts may obtain an advisory opinion of their probable transfer credits and class standing.

Financial Aid
Transfer students in need of financial assistance should file the College Scholarship Service’s (CSS) PROFILE Application and the Free Application for Federal Student Aid (FAFSA). It is recommended that students requesting financial assistance complete the application early.

Transfer applicants should note the University does review all transfer applicants for merit-based scholarships. These scholarships do not take into consideration applicants’ financial need. They are awarded based upon a holistic review of an applicants’ accomplishments and potential contribution. Scholarship awards generally range from $5,000 to $15,000 per year.

The following is a list of some of the merit awards for transfer students: Transfer Dean’s, Transfer Rush Rhees, Wilder Trustee Scholarship, Meliora Alumni, Phi Theta Kappa, Rochester Promise, Rochester Pledge, and Hillside-Rochester Work Scholarship.

For more information about these grants and merit-based awards, applicants should contact the Office of Admissions at (585) 275-3221.

Readmission
Students who withdraw from the College or are separated for any reason and who wish to re-enter should apply through the College Center for Academic Support. Applications for readmission are reviewed by the dean and other representatives of the College. 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 one to two months before the beginning of the term in which the students plan to re-enter. Readmission to the School of Nursing is handled through the Office of Student Affairs, (585) 275-2375.

Part-Time Students and Special Students
Part-time nonmatriculated (nondegree) students have an opportunity to try out various programs of study or just enjoy a class for personal enrichment. However, subsequent matriculation as a regular student, if desired, requires application for transfer admission. For details on registering as a nonmatriculated student, visit www.rochester.edu/osp. Matriculated students who wish to change their status from full time to part time, or vice versa, need to inform their dean prior to the first day of classes. Tuition will be adjusted for students who change their time status after classes begin.

For more information about part-time enrollment, please visit the Office of Summer and Part-time Studies, 4214 Dewey Hall, www.rochester.edu/osp, or call (585) 275-2345. Special guidance in planning a program of study in engineering is available from the Hajim School of Engineering and Applied Sciences in Lattimore Hall and in nursing from the School of Nursing in Helen Wood Hall. Part-time students are encouraged to write or call for appointments.

The category special student includes those full-time students who want 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 for only a term or a year. Students who have graduated from college but are considering a career change to medicine may be interested in the Post-baccalaureate Pre-medical Program; see www.rochester.edu/college/premed/.

General preprofessional advising is available to 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 in the Career Center. Prospective special students are welcome to direct their inquiries to the Office of Transfer Admissions at (585) 275-3221.
Financial Assistance

The cost of attendance comprises the Financial Aid Office’s estimates of the direct costs students can expect to pay to the University and the indirect educational costs that they will incur. Direct costs include items such as tuition and fees as well as room and board. Indirect costs, or those costs that do not appear on a student billing statement, include books and supplies, transportation, and personal living expenses.

The estimated cost of attendance for the 2011–2012 academic year was $56,760 of which the direct costs totaled $53,946. Please note that students who commuted during the academic year typically had a cost of attendance significantly less than a student who lived on campus due to differences in room and board costs.

Fixed Costs

Tuition for full-time undergraduates in the College was $41,040 for the 2011–2012 academic year. (Please note that tuition and fees for the Eastman School of Music and the School of Nursing will vary.) A room in a campus residence, double occupancy, was $7,350 per year. The most comprehensive board plan was $4,970 per year. Freshmen incur a one-time charge of $250 for meals and accommodations during orientation.

A mandatory health fee of $504 per year was charged to all full-time students.

All students pay an activity fee, which is established annually by the student government. The fee was $258 for the 2011–2012 academic year. In addition, all resident students pay a social fee of $14 for the academic year.

All students accepted into the Edmund A. Hajim School of Engineering and Applied Sciences become responsible for two years of equipment fees. These fees are normally assessed in the junior and senior years at a rate of $400 each semester.

In addition to fixed costs, undergraduates should expect to pay an average of $1,250 for books, $1,058 for personal expenses.

The College: Fixed Cost Summary 2011–2012

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<th>Cost</th>
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<td>Tuition (full-time student), the College</td>
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<tr>
<td>Room</td>
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<tr>
<td>Board*</td>
<td>$4,970</td>
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<tr>
<td>Fees (approximately)</td>
<td>$786</td>
</tr>
<tr>
<td>Total Annual Fixed Cost</td>
<td>$54,146</td>
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</table>

*Other plans available.

Engineering juniors and seniors pay an engineering equipment fee of $800 per year.

NOTE: Noncredit course fees. All persons attending noncredit courses must pay fees as announced for these courses.

Payment Options

Undergraduate students are billed on the basis of charges for each semester. The University offers three options for payment of tuition and fees.

1. A Monthly Payment Option consists of four monthly payments for each semester. An administrative fee is charged when this plan is chosen.
2. A Semester Payment Option consists of one payment for each semester.
3. An International Payment Option for students with an international billing address consists of one payment for each semester. Students are billed two months in advance of the due date and payment must be in US dollars and drawn on a U.S. bank.

The students billing statement is viewed online from the student portal: my.rochester.edu under UR ePAY. Students and Authorized Payers receive an email each month when the new billing statement is available. Students can set up individuals (parents, guardians, spouses, or third parties) as Authorized Payers to view and pay their bills online. Students are encouraged
to pay their bill online using UR ePAY via electronic check payment. Students are responsible for viewing their billing statement online each month and will not receive a statement in the mail. For more information regarding UR ePAY, visit the bursar’s website: www.rochester.edu/adminfinance/bursar and click on UR ePAY.

All students are required to sign a payment agreement. All other charges are due in full by the date indicated on the statement. If full payment is not received by the due date, the University assesses a late payment fee of 1 percent of the amount past due. Students who have not returned a Payment Agreement are unable to register for class until the Agreement is submitted and are expected to pay the full amount due before the next due date. Arrangements to have funds available for payment should therefore be made well in advance of each 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, participate in the housing lottery, or receive their diplomas. Students with delinquent balances at the end of a semester may be withdrawn from the University. All prior academic year balances must be paid in full before the start of the next academic year. Students whose past due balance is $5,000 or greater, or who submit a check that is returned by the bank, are subject to cancellation of registration for the current semester and withdrawal from the University unless acceptable arrangements are promptly made.

Financial aid awards to be received by students are used as anticipated credits against charges assessed, following receipt of all proper documentation. Questions concerning financial aid awards, what documentation must be submitted to the University, etc., should be directed to the Financial Aid Office.

A Prepaid Tuition Plan is available that enables incoming first-year students to prepay four years of tuition at the rate in effect during the year of initial enrollment. Enrolled students may join the plan at the beginning of the fall semester, as long as four or more semesters remain in their undergraduate program. The tuition rate charged is the rate in effect at the time they join the plan. More information on this plan and the other payment options is available from the bursar’s office via their website: www.rochester.edu/adminfinance/bursar/.

Financial Aid

The Financial Aid Office is here to help students and their families afford the investment of a Rochester education through a combination of different aid programs.

Applying for Financial Aid

Incoming students must complete the CSS PROFILE online at www.collegeboard.com. The University of Rochester school code is 2928, and our priority deadline is February 1 for regular decision applicants (December 1 for early decision applicants). Students may also be required to submit copies of federal tax returns as well as W-2 documents to the office for review.

In addition, students must submit the Free Application for Federal Student Aid (FAFSA) online at www.fafsa.ed.gov by February 1. The FAFSA is officially available after January 1. The University of Rochester school code is 002894.

All applicants who are not U.S. citizens or permanent residents should file the International Student Financial Aid Application, available through the Office of Admissions.

Renewing Financial Aid

Students receiving need-based financial aid must file the FAFSA each year. Additional application materials are also required, and students are notified at the beginning of the spring semester each year so that they may complete the application process by April 15. Returning students who do not submit their financial aid application with all supporting documentation by April 15 should be aware that they are not guaranteed full consideration for need-based aid and may have their aid reduced due to limited funding.

Estimated Family Contribution

The family contribution is based on an analysis of the financial aid application materials provided by each student that takes into consideration income, assets, family size, number of siblings in college, and other variables. As these variables often change from year to year, students must submit application materials each spring to assess the family contribution for the coming academic year.

General Awarding Guidelines

Students receiving merit- and/or need-based University scholarships/grants should be aware that certain restrictions apply:

- Entering freshmen are limited to eight semesters of scholarship/grant assistance; transfer students are eligible for assistance until the original graduation date determined at the time of admission.
- University scholarships/grants require full-time enrollment (at least 12 credits/semester).
- Students must meet Satisfactory Academic Progress requirements.
- University scholarships/grants are not available for summer coursework.

Merit-Based Scholarships

Merit-based scholarship recipients demonstrate outstanding academic achievement, talent, leadership, and potential. The Admissions Office carefully considers students’ application for admission when making these decisions. Merit-based scholarships will be included in the calculation of need-based aid. The Admissions section provides additional information on these awards.

Need-Based Financial Aid Programs

Demonstrated need is calculated by subtracting a family’s estimated contribution from the cost of attendance. The Financial Aid Office uses demonstrated need to determine eligibility for grants, loans, and work opportunities. While students’ financial aid packages are different, the following are some of the most
common financial aid programs. Amounts will vary based on students’ demonstrated need. Aid cannot disburse to the students’ account until 10 days prior to the beginning of classes each term.

Grants

Federal Pell Grant
A federal program designed to assist students whose families demonstrate the highest need.

Federal Supplemental Educational Opportunity Grant (SEOG)
A joint program between the federal government and the University of Rochester to provide additional funding to students whose families demonstrate the highest need.

New York State Tuition Aid Program (TAP)
A NYS program based upon a family’s NYS taxable income. This requires a separate application available once the FAFSA has been filed. Our school code is 1055. If the application is not completed, any estimated awards will be lost.

New York State Bundy Grant
A NYS program that allows the University to provide grant funding to NYS residents whose families demonstrate the highest need.

Rochester National Grant
The University of Rochester commits significant resources to need-based grant funding.

Endowed Scholarships
The Rochester National grant is funded through hundreds of need-based endowed scholarships.

State Grants
Certain states outside New York will allow their grant programs to be used at schools in New York. Contact your state agency for more information.

Loans

Federal Perkins Loan
The Perkins Loan Program is a joint program between the federal government and the University designed to provide low interest loans to assist students whose families demonstrate the highest need.

Subsidized Federal Direct Loan
The Direct Loan Program is a federal program designed to provide students demonstrating financial need with a low-interest loan to help cover the cost of education. Maximum annual eligibility is determined by the students’ class year standing.

Work Opportunities

Federal Work-Study Program (FWS)
The FWS Program is a joint program between the federal government and the University designed to provide opportunities for students to work during the school year to earn money to help cover their educational expenses. Opportunities are available across campus as well as the surrounding community. Students are paid an hourly wage for work performed. There is a special emphasis on community service opportunities.

Institutional Employment
Campus employment is not limited to the FWS Program. Many students without FWS eligibility work in dozens of different departments on campus.

Part-Time Employment
Students may receive Federal Work-Study as part of their total aid award. These earnings 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 Student Employment Office is the centralized site for on-campus information regarding job postings.

Other Financial Resources
In addition to the merit- and need-based programs offered through the University, there are many other financial resources students and families may wish to pursue. For example, the strength of the candidates who apply to the University often makes our applicants excellent candidates for outside scholarships. Family employers, local foundations, clubs, and community agencies are excellent sources for scholarship opportunities. In addition, students should take advantage of resources such as their guidance office, local library, and the Internet. The Financial Aid Office’s website includes links to multiple resources: www.enrollment.rochester.edu/financialaid.

Many families are also interested in financing a portion of the cost of education through long-term financing options. Additional information regarding these options is available on the Financial Aid Office’s website. Some common programs:

Unsubsidized Federal Direct Loan
The Direct Loan Program also offers an unsubsidized version for students whose financial need is met through other resources. The interest on this low-interest educational loan accrues while the students are in school.

Federal Direct Parent Loan for Undergraduate Students (PLUS)
The PLUS Loan Program allows parents to borrow up to the cost of education minus any other financial aid offered. This loan can be deferred while the students or the borrowers are enrolled at least half time in a degree-seeking program.
School of Nursing

School of Nursing Grants
For any nursing grants, please contact the School of Nursing directly at (585) 275-2375.

Federal Nursing Loans
Loans from this federal program are authorized by the Financial Aid Office. Repayment begins nine months after completion of studies. Similar to the Federal Perkins Loans, specified deferment provisions are available. Eligibility is restricted to U.S. citizens or permanent residents and on availability of funding.

For financial aid assistance for the School of Nursing, please see www.son.rochester.edu/son/prospective-students/finances/financial-aid.
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.

Disciplinary sanctions up to and including expulsion may be imposed upon members of the University community for certain infractions, including by way of example the following:

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; and

2. Acts which are illegal under the law, including, but 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.

The above is not an exhaustive list or description of the precise conduct that may lead to discipline, but is intended to be illustrative. Specific policies, rules, and regulations concerning academic and nonacademic conduct, and the procedures for addressing violations are available from the deans' offices of the College, the Eastman School of Music, and the School of Nursing.

University Records

The University policy on student records is available to students and their parents through the Office of the University Registrar.

Reports to Parents

Federal law permits the University to disclose education records to parents of dependent students. It is the policy of the University to consider all matriculated undergraduate students dependent until the age of 21 unless they formally declare their independence, either at the time of enrollment or subsequently through application to the dean's office of their college. The University and Eastman School registrars will release grade information to parents when permitted by law, unless the students object and/or disclosure would not be in the students' best interest in the judgment of the College. The College and the Eastman School of Music will generally honor written (not email), signed requests by students to release their grades to parents or other persons specified. Signed, written (not email) grade requests by parents of undergraduates will also generally be honored; however, the College may deny a request if the students object or if the dean decides that disclosure is not in the students' best interest or if the students cannot be claimed as dependents.

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, the students should so advise the registrar's office (College 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 students to the appropriate registrar's office.

Policies and Procedures

A list of publications that fully describe all policies and rules pertaining to University programs is contained in the course schedule published before the start of each term and on the University's website. These publications include, for example, an undergraduate course description handbook, the Official Bulletin:
Graduate Studies, the UR Here handbook and the College Dean of Students’ pamphlet entitled Student Discipline: Conduct Standards, Policies, and Procedures for Undergraduates. Policies and rules for nursing students are listed in the student handbook. Policies and rules for Eastman students are available on Eastman’s Office of the Registrar’s website.

This section of the Undergraduate Bulletin describes policies and procedures relating to the following:
- Academic Policies
- Academic Procedures
- Admissions
- Equal Employment Opportunity
- Family Educational Rights and Privacy Act (FERPA)
- Religious Holidays

Student Complaint Procedure
Both informal and formal procedures exist to resolve student complaints involving harassment, discrimination, and other issues. Information about such procedures can be obtained from the deans’ offices of the College, the Eastman School of Music, and the School of Nursing; from the University Intercessors; or by contacting the University’s Equal Opportunity Coordinator at 36 Wallis Hall, phone 275-9125.

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 offered at the University 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.

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Campus Map Key

1. Rush Rhees Library: Departments of History, Religion and Classics, and Film and Media Studies; College Writing Program; Multidisciplinary Language Lab; Computer Sales; 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 Minority Student Affairs; Higher Education Opportunity Program; and International Student Office.

3. Lattimore Hall: Office of the Registrar; Offices of the Dean of the College and of the Dean of the School of Engineering and Applied Sciences; College Center for Academic Support; College Center for Study Abroad and Interdepartmental Programs; Learning Assistance Services; Orientation Office; Departments of Anthropology, Linguistics, Modern Languages and Cultures, and Philosophy; Susan B. Anthony Institute for Gender and Women’s Studies; American Sign Language Lab; a 153-seat auditorium; classroom and seminar rooms.

4. Strong Auditorium: Two halls, seating 1,000 and 400 persons, used for lectures, films, stage productions, and concerts.


7 and 8. Dewey Hall and Carol G. Simon Hall: Margaret Warner Graduate School of Education and Human Development administrative and faculty offices; William E. Simon Graduate...
School of Business Administration administrative and faculty offices; teaching laboratories of The Institute of Optics.

9. Hoyt Hall: 300-seat auditorium for lectures, meetings, films, and conferences.


11. Meliora Hall: Office of the Bursar; Office of Student Financial Assistance; College Career Center; Departments of Brain and Cognitive Sciences and Clinical and Social Psychology; Center for Visual Science; River Campus Copy Center; administrative offices; and general classroom facilities.


13. Gavett Hall: Offices, classrooms, and laboratories of the Department of Chemical Engineering; laboratories of the Department of Mechanical Engineering and of The Institute of Optics.

14. Taylor Hall: Center for Electronic Imaging Systems; College Facilities Machine Shop.

15. Hopeman Engineering Bldg.: Offices, classrooms, and laboratories of the Departments of Electrical and Computer Engineering; Mechanical Engineering, Biomedical Engineering.

17. Wilmot Bldg.: Offices, seminar rooms, and laboratory facilities for The Institute of Optics.

18. Robert B. Goergen Hall for Biomedical Engineering and Optics: A 100,000-square-foot building that houses the Department of Biomedical Engineering, including student and faculty laboratories, auditorium, and classrooms. Also houses faculty offices and research laboratories for The Institute of Optics.

19. Computer Studies Bldg.: Offices, classrooms, and laboratories of the Departments of Computer Science and Electrical and Computer Engineering; Carlson Library.

20. Hylan Bldg.: Offices of the Department of Mathematics; Office of Research and Project Administration; Office of Technology Transfer; classrooms, conference rooms, commons rooms, and seminar rooms.

21. Hutchison Hall: Classrooms, lecture halls, laboratories, offices, and commons rooms of the Undergraduate Program in Biology and Medicine; Departments of Biology, Chemistry, and Earth and Environmental Sciences; a greenhouse complex. 

Hubbell Auditorium: 485-seat auditorium in Hutchison Hall for lectures, special meetings, and conferences.

Lander Auditorium: 148-seat auditorium in Hutchison Hall.

22. Wallis Hall: University administrative offices; Office of Admissions.

23. Interfaith Chapel: Center for campus religious activities and chaplains’ offices.

24. Todd Union: Noteworthy as one of the first student unions in the United States, essentially replaced by Wilson Commons. Houses the offices of the River Campus Music Department, the Campus Postal Unit, a bank, Todd Theater, and two student radio clubs, WRUR-AM and FM and KZWI (Amateur Radio).

40. Wilson Commons: The campus center with student organization offices, a recreation center, lounges, meeting and performing facilities, dining services; Office of the Dean of Students; the Common Ground coffeehouse; Hirst Lounge; William H. Stackel Meeting Room; Hartnett Art Gallery; Arthur J. May Multi-Purpose Room; Samuel M. Havens Lounge; Fred Gowen Room; Ruth Merrill Student Organization Center; George Graham Smith Plaza.

41. Frederick Douglass Bldg.: A student dining center; meeting rooms; University bookstore; The Meliora (formal/informal dining).

42. Goergen Athletic Center: An 11,000-square-foot fitness center, locker rooms, a multi-activity center, a central issue room for equipment, and all departmental offices; the Palestra is home to Yellowjackets basketball and volleyball in addition to serving as a venue for University concerts and special events; field house includes an indoor 200-meter running track and synthetic activity infield; aquatic center includes a 25-yard by 25-meter pool and a separate diving well with one- and three-meter diving boards; also houses an athletic training facility; four indoor tennis courts, five international squash courts, two racquetball/handball courts, an aerobics studio, and three combination basketball/volleyball courts.

43. Fauver Stadium: 5,000-seat stadium with a lighted, artificial-turf playing surface surrounded by an eight-lane, 400-meter running track. Site of intercollegiate field hockey, lacrosse, football, soccer, track and field. The Parking Office is on the First Floor Concourse Area.

44–48. Susan B. Anthony Halls: Undergraduate residence and Danforth dining center; Services Division offices.

49. University Health Service: Center for student and employee health, offering primary care, physical therapy, and occupational health care by appointment. Student health insurance, health records, and immunizations. University Counseling Center.

50. Spurrier Hall: Dance studio and music practice rooms.

54. Sage Art Center: Teaching and studio facilities for visual arts programs.

68. **Towne House**: East Wing—Human Resources; Clinical Practice Evaluation; Center—Graduate Housing; Neurology Clinical Trials Coordination Center. West Wing—University Computing & Systems Center; Telecommunications.

72, 88, 89, 90, 91, 97. **University Apartments**: George Washington Goler House; University Park, Maisonettes, de Kiewiet Tower, Valentine Tower; Whipple Park.

73, 75, 78, 81, 86. **University Medical Center**: Eastman Dental Center; Wilmot Cancer Center; Strong Memorial Hospital; School of Medicine and Dentistry; School of Nursing.

84. **Arthur Kornberg Medical Research Bldg**: Laboratories and offices for the Aab Institute of Biomedical Sciences.

85. **Ernest J. Del Monte Neuromedicine Institute**: Laboratories and offices for the School of Medicine and Dentistry.

86. **Helen Wood Hall**: School of Nursing; Program for Pediatrics; Departments of Community and Preventive Medicine and Family Medicine; classrooms.

92. **University Facilities Center**: Administrative offices for Facilities and Services' divisions; Associate Vice President for University Facilities and Services; Parking; River Campus Facilities; Support Operations; Finance; and Human Resources.
Index
## Abbreviations

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